surface have been checked by cupping externally, and by lunar caustic internally; whilst the emeticised antimonial powder accumulated in the system had at length come into active operation, and had found an outward vent through the relaxed pores of the skin.

Two Europeans lived in the same house in Calcutta. The cholera was raging in the neighbourhood. They did not escape its influence. They were attacked with the premonitory symptoms of the disease about the same hour on the same day. The attack was neglected in the first instance, and, in consequence, the symptoms progressed unfavourably in each case at an equal pace. Subsequently, the treatment adopted was precisely the same in each; they received the same medicines; they were attended with the same assiduity.

When the cholera had advanced to the third stage, and the patients had not strength to swallow medicine, orders were given to the servants to remain at the bed-side of each patient, to supply them with hot or cold drinks, should they ask for either. In the course of an hour after leaving the house, one of the patients died. It was reported, at the same time, that the second European was struggling in the jaws of death, but was as sensible as on the day previous to his seizure.

Shortly after the reported death of the first patient I revisited the house, and found the second European literally streaming in sweat. Every article on his person,—his sheets and bedding, were soaked with perspiration! the perspiration from the skin was warm, and was pouring out at every pore. His pulse had risen, and was easily felt in the large arteries. He had recovered his voice and speech, and expressed an inward conviction that his life was saved. His prediction proved true: he recovered, and soon afterwards quitted India for England.

On board the ship "Sophia," before the vessel was taken in tow by the steam-tug, two coolies, who had come from the same village, were seized with cholera.

They were seen by me at the same time. The medicines ordered for one were prescribed for the other. They were ad-

SELECTIONS

FROM

MY MEDICAL NOTE-BOOK:

OR

PRACTICAL OBSERVATIONS

ON

The Indian Village Cholera, and its treatment by Cupping externally and Lunar Caustic internally.

The Use of Tartar Emetic in the treatment of Intermittent Fevers.

Acute Inflammation of the Stomach, produced by the intermixture of verdigris with the food—and hints on the management of Coolies emigrating to Mauritius and the British West India Colonies.

The Hospital Gangrene, which attacked the wounds of the Privates, and Non-Commissioned Officers of H. M.'s 78th Regiment, after the battles of Perumbakum and Subraon.

The use of Lunar Caustic in the treatment of Hydrocele.

BY

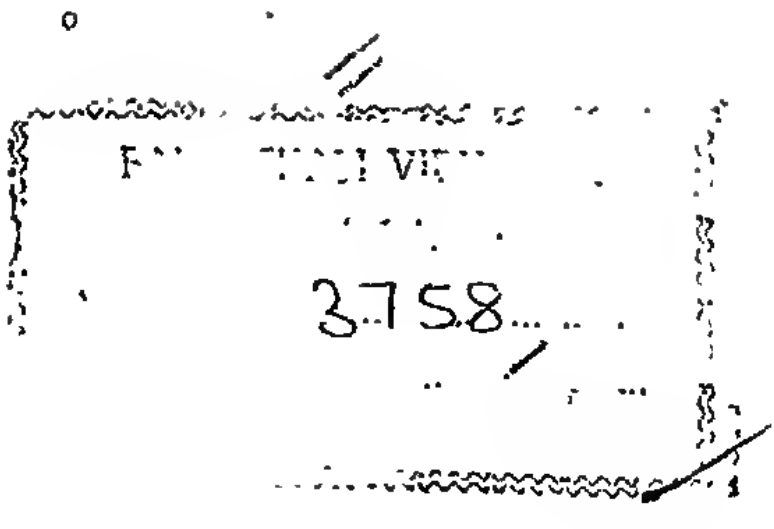
THOMAS MOORE, B. A.

ASSISTANT SURGEON—BENGAL MEDICAL SERVICE.

Calcutta:

R. C. LEPAGE AND COMPANY, BRITISH LIBRARY.

1852.



DEDICATED

TO

FRANCIS MOORE, ESQUIRE,

PARIS,

BY HIS NEPHEW

THE AUTHOR.

Lallutpore, 1852.

INTRODUCTION.

In the hope that the following selections from my Medical Note-Book, contain suggestions which may prove instrumental in saving human life, more especially in the treatment of that terrific scourge,—the Indian Village Cholera,—I have acceded to the request of a few esteemed friends, to have them published in the shape of a pamphlet.

The plan of treatment pursued by me in Cholera, and in the different types of Intermittent Fever, may not be approved of by some, and may be cavilled at by others. I merely solicit for them a fair trial and no favour. By the results, let them be judged.

Lallutpore, 1852.

CONTENTS.

Cholera.

Intermittent Fever.

Intermixture of Verdigris with the Food.

Hospital Gangrene.

Hydrocele.

In its progress, the Indian village cholera is divisible into three stages. The symptoms which denote the premonitory stage from the second or intermediate stage, and this latter from the third or last stage, are, in general, well marked. During the visits I have made from time to time, in villages where the cholera has been raging, as well as in the course of visits to vessels lying off Calcutta, freighted with coolies, I have had frequent opportunities of noting the onset of the disease, the development of the symptoms, the progress and fatal termination of those symptoms.

Whether cholera has come under my observation in the huts of the natives in their villages, or on board ship, when in medical charge of cooly emigrants, or in regimental and civil hospitals, I have noted a degree of uniformity in the symptoms by which each stage of the disease has been indicated. The exceptions have been few. I propose, therefore, to select the results of cases treated by me on one occasion as illustrative of the particular features of each stage of the Indian village cholera.

Fatal cases of cholera in the third or last stage.—The Indian labourers, destined as emigrants for Mauritius, had not been on board the "ship Sophia" more than twelve hours, when I was summoned from shore to visit the vessel, in consequence of the outbreak of cholera. The disease had commenced with the men. Until the third day's sail from the Sand Heads, men, women, and children, were attacked by it. To our relief, the cholera then disappeared. It may

not be out of place to notice, that by this time, few of the coolies were able to appear on deck in consequence of sea-sickness.

The symptoms and general features of the disease, as the vessel lay at anchor off Cooley Bazar, were of the worst type. When I went on board, there were three men in the last stage of cholera. They were cold, and covered with a clammy sweat. The perspiration was oozing out in large drops on the forehead, the neck, and on the chest. Their eyes appeared sunken in their sockets. Their breath was cold. In each case the tongue was cold. Their features were shrunk. The skin of the face seemed to have been pinched backwards. The voice was feeble, hollow, inarticulate. Their strength was completely prostrated. In two of these cases the pulse at the wrist was imperceptible; in one, barely perceptible. In the larger arteries the pulse could be felt. It was quick, and communicated to the touch a feeble vibration.

The impulse of the heart could not be felt. The action was rapid, distant, and indistinct. The first, or muscular sound of this organ, was almost inaudible. The second, or arterial* sound was clear, sharp, distinct. The breathing was short, and at intervals laboured. The extremities were icy cold. The nails of the fingers and toes of a deep blue colour, as if steeped in indigo, were curved inwards. Their pulpy points were shrivelled. The calves of the legs suffered from spasmodic contractions. The muscles of the forearm and arm, in like manner, were seized with convulsive spasms, and became round and hard, as resisting under the grasp as balls of iron.

---

* I believe the credit, if there be any, may fairly be claimed by me, of having upset the absurd theory, that the second sound of the heart is valvular; and the credit, also, of having established the fact, that the sound heretofore called the second sound of the heart, is neither more nor less than the sound proceeding from the action of the large arteries.

Vomiting and purging had ceased in two of these cases, and were succeeded by hiccup and dry retching. In the third case, the rice-water or sero-mucous discharge continued to trickle from the bowels, without the knowledge of the patients. Their only desire was for cold water, to quench an insatiable parching thirst.

At the commencement of the attack, frequent and copious rice-water discharges from the stomach and bowels were the most prominent symptoms. Weight, and oppression and spasmodic twinges in the epigastrium, and along the course of the diaphragm, quickly followed. In each case the abdomen was sunken, doughy, inelastic under pressure, without pain or tenderness, until the spasms extended to the rectimuscles. The secretion of urine was suppressed.

These cases of cholera, in the last stage of the disease, had well nigh run their course previous to my visit on board. I need scarcely add, they terminated fatally.

Cases of Cholera in the second or intermediate stage.—Besides the three cases in the third or last stage of cholera, there were two men, one boy, and one woman, in the second stage of the disease. Vomiting and purging were the most prominent features in each case. These were the symptoms chiefly complained of by the patients. The liquid discharges from the bowels were slimy, sero-mucous, depositing a flaky sediment, and resembled conjee-paree, or rice-water. The fluid rice-water discharges from the bowels occurred sometimes twice, sometimes three times, or more frequently, in the hour, but occasioned no pain nor uneasiness in the abdomen.

The act of vomiting was frequent, and attended with a feeling of constriction at the pit of the stomach, and with spasmodic twitches shooting back towards the spine. The abdomen was free from pain on pressure, felt soft to the hand, and in three cases was inelastic. In a fourth case it was distended with flatus, but in none was the abdomen pinched inwards and backwards towards the spine.

The feet and hands retained some degree of warmth. In the rest of the body the heat was above its natural standard.

In the calves of the legs, the muscles were spasmodically contracted. The spasms, however, were not severe; nor protracted in duration. They yielded in general to the hand rubbing and shampooing used by their friends. The tongue in each case was loaded, moist, and warm. With this moisture of the tongue thirst was urgent. The desire for cold water, to allay the dried parched feeling in the mouth, could not be satisfied. They were allowed to drink as much water as they wished.

The pulse was quick, varying from 110 to 120, sharp, contracted, wiry under the finger, perceptible at the wrist. The impulse of the heart could be felt. Its action was strong. Its sounds were distinct. In all, there was a marked degree of anxiety in the countenance. Some dulness and suffusion of the conjunctiva of the eyes were noticed, but there was not present that sunken state of the eyeballs into their sockets so characteristic of the advanced stage of cholera. With the exception of the woman, the patients, although weak, possessed sufficient strength to walk from the larboard to the starboard side of the vessel. The secretion of perspiration from the skin was checked. The secretion of urine was suppressed in two; in the others, when passed, it was scanty in quantity, and high-coloured.

As to the origin of their illness they were not able to give any satisfactory account. They felt themselves suddenly prostrated in strength after arriving on board. They suffered from languor, from pains and aches over the body and in their limbs, striking upwards and inwards towards the pit of the stomach. All their pains seemed to centre in this particular part of the stomach. Upon these, sickness of the stomach, quickly followed by vomiting and purging, supervened. The discharges of fluid afforded relief. They were not described as having added to their sufferings.

The woman remained under treatment for twelve or fourteen hours. The symptoms progressed unfavourably from hour to hour. They assumed the features of the third stage of cholera. She died. The treatment adopted in the case of the

boy checked the vomiting and purging. Hopes of his recovery were entertained. They were not realised. The stage of collapse set in. The pulse disappeared at the wrist. The body became cold, and covered with a clammy sweat. The eyes sank in the sockets. The muscles of the extremities were cramped into hard, round balls. The tongue became cold; the breath cold. He died.

The recovery of the other cases took place before we cast anchor in Saugor Roads.

Cases of cholera labouring under the premonitory symptoms.—The cases labouring under the premonitory symptoms of cholera were few. They did not number more than four. The symptoms of which they complained were prostration of strength, wandering pains about the body, more particularly in the loins and abdomen; distaste for food; nausea, and inclination to vomit; rumbling of the bowels, occasionally attended with griping and looseness; thirst, with full and loaded tongue. The pulse in each case was full and compressible, ranging between 90 and 95. The skin was hot, rough, and dry.

Three of the cases recovered under the treatment adopted. They were convalescent before the vessel reached Diamond Harbour. The symptoms in the fourth case did not yield so soon to the treatment. The symptoms of the second stage rapidly set in. With difficulty this man's life was saved.

Such, then, were the symptoms by which the premonitory, intermediate, and last stages of the Indian village cholera, amongst these Indian emigrants, were denoted. Such, I may add, is the group of symptoms which has marked the progress of these three stages of cholera in almost all the cases noted by me. With atmospheric changes, the symptoms may vary in degrees of intensity. With atmospheric changes, the virulence of the symptoms may become modified. Under the influence of certain changes in the atmosphere, the disease may disappear as suddenly, and in as unaccountable a manner, from its locality on shore, or from the vessel afloat, as it has

made its appearance suddenly and unexpectedly. These modifications in the symptoms, arising from the state of the atmosphere, or from peculiarities in the constitutions of patients, I regard as exceptional; so marked, in general, has been the uniformity in their intensity during the development of each stage of the disease.

Whatever the eauses may have been which contributed to the sudden appearance of cholera on board, there can be little doubt that the cases which terminated fatally exhibited the symptoms of the disease in its severest form.

The symptoms recorded in the fatal cases may be regarded as those met with in three-fourths of the cases which terminate in like manner. In this, the third or advanced stage of the Indian village cholera, the discrepancy whicb exists in the catalogue of symptoms is perhaps less than in any otber disease, with which I am acqnainted. The accurate record of the symptoms in a single case will serve to denote those in nine tenths of the cases similarly affected, and swept away in the same incredibly sbort space of time. More particularly, in reference to the natives of India, does this observation hold good.

A single report from a village, to the effect that cholera has made its appearance, is sufficient warning that in the course of a few days the inhabitants of that same village will be carried off by tens and twenties, and that in the reports subseqnently made, there will not he the slightest difference in the development and rapid progress of the symptoms, until the force or virulence of the cholera shall have expended itself.

General results of treatment in the third stage.—When cholera has advanced to the third stage, medicine and the skill of the physician can effect bnt little. Cases of recovery, under successful treatment, have been recorded. In what form of disease have not cases of the last or hopeless stage been successfully treated, and duly recorded?

The Pharmacopœia has been ransacked for some potent specific,—for some infallible anti-cholera pill, or powder, or drop, or mixtnre. Apparently the search has not been made in vain. For this, the direst scourge of the human race, I

believe there are more specifics known, and publicly advertised, than for any other disease to which the human system is subject,—the venereal disease excepted. Did these anti-cholera specifics possess only a fractional part of the virtues attributed to them by their puff-masters, mankind would have little to dread from cholera.

In the East, or elsewhere, cholera in its third stage is, numerically speaking, as fatal, perhaps more fatal, than yellow fever in the West, when black or coffee-ground vomit indicates that the disease has progressed to an advanced stage.

An eminent physician in British Guiana, in listening to the thanks of a British sailor, when discharged from hospital after his recovery from yellow fever, with black or coffee-ground vomit, stopped him abruptly—'My man, you're more indebted to God's providence for your recovery, than to the skill of the doctors, or to the virtues of their medicines. Now, discharge a portion of that debt to your Creator, by doing good to your fellow-creatures. Bear this in mind, whenever you see or hear of any comrade taken ill on board, or on shore, as you were *at first*; send him off to us at once. We doctors may be able to do something for him then.'

The same remark might with propriety be applied to cholera in its advanced stage. However, cases have recovered under the skilful treatment of skilful physicians. They have recovered under the use, and by the instrumentality of medicines, trumpeted forth as potent, infallible specifics. True! these facts cannot be questioned. On the other hand, it would be instructive, to have figured statements published, exhibiting the exact numerical proportion which the cases of recovery from cholera, in its third stage, bear to the number of cases skilfully, yet unsuccessfully, treated by these same potent, infallible specifics. The first glance at that figured statement will prove to non-professional, as well as to professional men, how ineffectual medical treatment has been in endeavouring to *restore life to a breathing corpse*; to infuse vitality into the system of a cholera-stricken patient, in articulo mortis.

The results of medical treatment in this stage of cholera ought to he impressed on the minds of the public, to arouse some degree of earnestness on their part to hefriend themselves. The premonitory stage, and the second or intermediate stage of cholera, are amenahle to treatment. Medicines and remedial measures can effect much to arrest the progress of cholera.

If we divest the Indian village cholera of the terrors which its name conveys to the mind,—if we examine its symptoms in the three different stages,—if we examine also the source from whence these symtoms proceed, we may he able to ohtain a clue to some mode of subjecting cholera to rational, and not to empirical treatment. But, first, it is necessary that our ideas as to the form of disease be clear and distinct. If two or more forms of disease be gronped together under the general term cholera, and be recognised as such hy the profession, it is mere waste of time, and waste of words, to discuss the snbject. The looseness of medical phraseology is proverbial; and the looseness with which diseases, withont the slightest relationship to each other have been jumbled together, has created confusion.

Be it our task, then, to steer clear of snch imaginary forms of disease,—as windy cholera and dry cholera,—of bilious cholera and putrid cholera, and of an infinite variety of snbdivisions of cholera. They have no existence, save in the imaginations of those who write books and pamphlets.

Seat of the disease.—The seat of cholera,—the genuine type of which I consider to be that form prevalent in Indian villages during certain months of the year,—is in the mucous membrane of the howels, and in the structures snbjacent to, and contributing to the formation of, the several coats of the intestines. In a practical point of view it is a matter of little conseqnence in which of the component strata of the mncous membrane of the intestines, the source of the symptoms, and conseqnently the seat of the disease, he fixed.

This system of isolation of a particular memhrane to the exclusion of all others cannot serve any practical end in the

treatment of disease. Let others settle, beyond the possibility of further dispute, whether the symptoms of cholera originate solely in a morbid condition of the epithelium, or in that of the membrana propria. Be it the province of others to settle whether the symptoms spring from a disorganised state of the blood, circulating through the minute net-work of intestinal capillaries, from a feeble and paralysed condition of the coats of this vascular tissue, or from a palsied state of the ganglionic system of nerves, and of the nervous filaments distributed to the intestines. Let it be determined by others, whether the symptoms can be traced to a fretted and irritable state of the nuclei or cytoblasts imbedded in the mass of amorphous matter, —or to irritability, vascularity, and incipient inflammation of the solitary and agminate glands of the intestinal tube:—for all practical purposes it will suffice to know, that collectively, not separately, do the component strata of tissues endued with vitality contribute to produce the symtoms characteristic of the Indian village cholera.

Are we never to arrive at a rational conclusion as to the nature of cholera,—as to the seat of cholera,—as to the invariable and unvarying symptoms of cholera,—as to the treatment of cholera on a rational basis? Is it decreed, that, year by year, and visitation after visitation, we must grope in the dark, blinded by ignorance? If pathological anatomy be a reality, and not a delusion, it ought not to be so.

In the mortality list is contained the pith of every proof required to upset all speculative theories and discordant opinions as to the nature, as to the seat, and as to the source of the symptoms in this scourge, cholera.*

Beyond the possibility of cavil, pathological anatomy has revealed, and has proved, that the only type of disease deserving the name cholera, originates in a blaze of inflammatory action, involving every membrane, every tissue, and every glandular body in the gastro-intestinal canal, from the œsophagus to the rectum. This morbid condition of the stomach and intestinal

---

* *Vide* Cases.

canal, will be found in every case of cholara where the examination of the viscera has heen conducted within one hour after death.

Pathological anatomy has revealed, and has proved, that the symptoms characteristic of cholera arise from intense vascularity,—from a fretted and irritable and sero-mucous eliminating condition of tha mucous membrane and subjacent tissues of the stomach and intestinal canal. Pathological anatomy has revealed, and has proved, that the elimination, filtration, percolation, and oozing out from the system of serum, of mucus, of lymph, and of the saline ingredients of the hlood, into the cavity of the stomach and intestinal tube, tend to devitalise that portion of the vital fluid, which remains in circulation. Pathology has revealed, and has proved, that in consequence of this extensiva and rapid exudation from every inch of the internal mucous surface, the relativa proportions between the serum and crassamentum, and other ingredients of thc blood, are destroyed: thc hlood in circulatiou hecomes thick, hlack, and tar-like; flows sluggishly towards the heart, and stagnates in the parenchymatous tissuc of one or several of tha solid viscera. Finally, this sudden hreak-up of the normal, tha regulated proportions between the constituent principles of tha hlood, proves to he the direct cause of the fearful rapidity with which the powers of life sink.

Unless the viscera he examined at an early period after death, we can form but a faint idea as to the mischief which has been in active operation during life. If deferred for several hours, the appearances in the stomach and duodenum, jejunum, ileum, colon, and rectum intestines, are illusory. The diffnse and continuous scarlet and deep crimson rad efflorescence will hava subsided. With the exception of a faded rose-coloured tint, and of a few straggling veins gorged with hlood, there will not remain a trace of tbe mucous membrane, and of the subjacent tissnes, having been the seat of inflammatory action. The internal surface of the stomach will he pale, and consequently deceptive, although covered over with a layer of tenacious, glutinous, or gelatinous mucus, semitrausparent, and

possessing the consistence of a thick solution of isinglass. The internal surface of the small intestines will be pale, or will present a faded rose-coloured tint, although besmeared with a ropy, inspissated, and gelatinous mucous exudation: and although at the same time they are distended with secretions of serum, of mucus, and of lymph, all blended together, and forming a thick puddle.

Symptoms of the disease.—Rice-water discharges from the bowels, and rice-water vomitings from the stomach, constitute the tests of the true type of cholera. All other symptoms may be regarded as secondary to these. In nine cases out of ten they follow as a necessary consequence, when the cases have been abandoned to themselves.

A medical man cannot be more practically acquainted with this type of cholera than the native, who, for a series of years, has been an eye-witness to its ravages in his village. That native looks forward to the re-appearance of cholera year after year, with the same degree of certainty with which he looks forward to the return of the rainy season in each year. Question him as to the symptoms of the disease—question him as to those symptoms in particular, regarded by him as proofs that his fellow-villagers had been attacked by cholera, and had been swept away through its deadly influence.

Rice-water discharges from the bowels, and rice-water vomitings from the stomach, are the proofs associated in his mind with the severest, the worst type of the disease. Without the existence of these symptoms he cannot be persuaded that his fellow-villagers have died from cholera.

What, then, are these rice-water discharges?

So far as inspection and analysis can be relied on, the dejections from the bowels, and the vomitings from the stomach, resembling conjee-panee, or rice-water, are sero-mucous secretions exuded through, exhaled from, or thrown off by, the mucous and subjacent membranes of the stomach and bowels. They consist of globules of lymph, globules of mucus, and globules of the serous and saline ingredients of the blood. They appear to differ in no essential particular from the sero-

mncous sccretions copiously and rapidly thrown off from the mucous membranes in other parts of the body. In point of consistence, and in point of quality, inspection and analysis and the microscopical researches of anatomists, have not as yet established any material difference. This fact is of importance, viewed in reference to the treatment of cholera.

The globules of lymph, with their discs—the globules of mncous, with their discs—the particles of the serous and saline ingredients of the blood, presenting every variety of shape, elliptical, circular, octagonal, and irregular, nnder the magnifying powers of the microscope, have been mistaken for fungoid bodies, or for some other fanciful description of living organism. The bodies seen nnder the lens of the microscope are merely the constituent particles of the fibrinous and sero-mucous secretions eliminated from the irritated, the vascular, and the intensely inflamed surface of the stomach and intestinal canal.

The quantity, more than the quality, of these sero-mnoous discharges imparts to the Indian village cholera its formidable nature. The quantity, more than the quality, of these same discharges, in like manner draws a line of distinction between the fatal effects of the disease, cholera, compared with the fatal effects of other diseases originating in the morbid condition of the mucous membranes in other parts of the body. The quantity, as well as the qnality, cannot be too closely observed. Combined, they serve as guide-marks to the practitioner in the recoguition of cholera. They also serve as guide-marks in the treatment to be adopted during its rapid progress from stage to stage.

If we reflect for a moment on the extent of mucous surface, commencing at the cardiac orifice of the stomach and terminating at the rectum, involved in a blaze of inflammatory action, involved in a continnous sheet of deep crimson or scarlet efflorescence, and engaged in eliminating from its structures these rice-water or sero-mncons discharges, it ceases to be a matter of surprise that cholera should prove rapid in its progress and fatal in its consequences.

When, therefore, the Indian village cholera has had its way unchecked,—when the premonitory symptoms have been trifled with,—when the intermediate stage marches apace, whilst medical men befool themselves in experimenting with popular delusions, called specifics,—when rice-water discharges from the bowels follow, at short intervals and in quick succession, rice-water vomitings from the stomach,—the victim from cholera in the short space of a few hours virtually becomes a *breathing corpse*. With icy breath, stopped pulse, large drops of cold, clammy sweat pouring from every pore: with blood congealed, features pinched, and skin blue and shrivelled, that victim utters in hollow, but prophetic accents, his conviction of approaching death. Hence the necessity of impressing on the mind of the public that they owe a duty to themselves to pay strict attention to the first indication of derangement of the stomach and bowels, when the grim visitant has made its appearance in their locality.

Too much stress cannot be laid on the excessive elimination of sero-mucous fluid, rendering cholera formidable in its nature, and disproportionably fatal in its effects, compared with other diseases. From a small extent of surface, sero-mucous discharges, when profuse, are not altogether free from serious consequences. From so trifling a disease as cold in the head, I have seen men of the strongest frame of body completely prostrated. In one case, a man of powerful muscle, *the mucous membrane of the nose was affected. Sero-mucous* discharges were eliminated in profuse quantities. In the words of the patient, the mucus flowed in a continued stream from the nose, from morning to night. From a cause so trivial as this, the man lay in bed completely exhausted: his pulse was small, quick, and wiry. His face was flushed. His eyes were suffused. The constitutional disturbance was marked. The mucous membrane of the nose was irritated, but comparatively pale.

The excessive elimination of sero-mucous fluid from the mucous membrane of the bronchial tubes of the lungs, has proved rapidly fatal in many cases. During the epidemic

influenza of 1838-39, a lady had been complaining for a few days of the symptoms of slight fever. Unexpectedly she commenced to expectorate in large quantities a sero-mucous fluid of the consistence of thin gum water. This was followed by an oppression of the breathing, and by a sense of suffocation. During the day her sufferings can scarcely be described. Towards evening her face became livid, her extremities cold, the surface of the body of a blnish colour. The muscles of the chest became spasmodically contracted, in the violent efforts made to respire and to expel from the lungs, this rapidly secreted mucus. All efforts to arrest the disease, and to afford relief to the patient, failed. Medicine after medicine was administered, without the slightest impression having been made upon the symptoms. In thirteen hours from the time she commenced to expectorate, she was a corpse. In the post-mortem examination the trachea and bronchial tubes were found loaded with a thin, gum-like, sero-mucous fluid. The mucous membrane was pale. There was scarcely the trace of a blood-vessel visible.

When we place in juxta-position with facts such as these, the results of excessive elimination of sero-mucous fluid from the entire extent of the internal surface of the stomach and bowels, can it he any longer a matter of speculation why the Indian village cholera should sweep away its victims in so incredihly short a space of time?

Pathology of the Indian village cholera.—I have stated that the true type of cholera is a disease originating in a blaze of inflammatory action, which involves every tissue in the stomach and gastro-intestinal canal, from the œsophagus to the rectum. I have to admit, however, that, under certain circumstances, pathological anatomy has not thrown much light on the disease. I have to admit that, under certain circumstances, these views will not be corrohorated by pathological anatomy.

Dissection after dissection has been made. The minutest examination, with the eye, of the solid viscera,—of the membranes of the intestines, and of their component strata,—of

the blood in the veins, and of the contents of the intestinal canal, has been made without disclosing a condition of the viscera, and of their structures, which could be pronounced decidedly morbid. The use of the microscope applied to the examination of the membranes and solid viscera, has yielded results in no wise more satisfactory.

Results of pathological anatomy such as these have led to scepticism as to the source of cholera. They have tended to mystify,—they have failed to clear away, the doubts of medical men as to the seat of cholera.

In the ordinary run of diseases, pathological anatomy elucidates plainly and simply, but unmistakeably, the seat of the disease from whence the symptoms have proceeded. Cause and effect are set forth in such prominent relief, that ignorance and scepticism are at once dispelled. But in cholera, in numerous dissections conducted under my immediate surveillance, pathological anatomy has not revealed a morbid state of the visceral structures distinct, extensive, and widely diffused.* Pathological anatomy has not exhibited an abnormal state of a particular viscus,—nor of a particular membrane, upon which the finger could be placed as the seat of the disease, —as the positive source from whence the symptoms of cholera took their origin.

In this respect pathological anatomy has afforded no other aid than that of negative evidence. The dissections have proved that which cholera is not. Pathological anatomy has demonstrated, that those who had fallen victims to the Indian village cholera had not died from the effects of hepatitis, of splenitis, or of nephritis: nor had they died apparently, and in the ordinary acceptation of the term, from the effects of gastritis, duodenitis, ileitis, nor enteritis. Never have I seen the liver, the spleen, the pancreas, and the kidneys, more healthy in appearance than in many of those cases of

---

* The time allowed to intervene between the patient's death and the examination of the viscera, is the cause of the diffuse and scarlet efflorescence having disappeared.

cholera where death has occurred between fifteen and twenty hours from the onset of the disease. Never have I seen medical men more disappointed in their expectations than at the close of the post-mortem examination of a patient who had died from the effects of cholera.

The symptomatology of the disease is perfect. The pathology of cholera, upon which its symptomatology depends, is not invariably apparent to, nor can it be traced by, the eye, unless the examination of the viscera be conducted within one or two hours after death.

If this be true, what pathological changes have been noted in the membranes from which the rice-water sero-mucous discharges have been so profusely eliminated?

The mucous membrane of the stomach and intestines has appeared pale, smooth, shrunk, or shrivelled, without the trace of a blood-vessel being visible in a few instances. The mucous membrane has exhibited a pale, a faded rose-coloured tint, or a bluish white discoloration, in a still greater number. The membrane has appeared relaxed, and slightly thickened, from intumescence and puffiness of the coats, besmeared at the same time with the liquid, gum-like, rice-water fluid, voided during life from the bowels and from the stomach. The coats of the intestines have felt doughy under the fingers, from the infiltration of serous fluid into the submucous cellular tissue.

"In the interior of the intestinal tube there has been found, with few exceptions, collected in the duodenum and jejunum intestines, a quantity of cream-coloured, cheesy, pultaceous substance, in a semi-fluid state, resembling in some degree the curds of whey. The blending together of serum, of mucus, of lymph, and of the saline ingredients of the blood, formed this puddle, peculiar to cholera. The ileum intestine has been distended with pure serous fluid, or coated over with a tenacious, viscid, inodorous substance, resembling a thick paste of flour and water. From its consistence, no doubt could be entertained as to its being a collection of inspissated mucus. The large intestine has contained a quantity of opaque muddy fluid, resembling the sediment of rice-water, or of barley-water, corre-

sponding in every respect to the true cholera stool, or sero-mucus discharge, loaded with flakes of lymph, passed during life.

But, as to the solid viscera, it did not appear that any change in their structures had taken place when the patients had been in robust health previous to the attack of cholera; nor was it noted in the same cases that the lungs and their membranes, or that the brain and its enveloping membranes, had undergone any morbid alteration.

Traces of venous congestion, and of inflammatory redness in the mucous membrane of the stomach and small intestines, have been strongly marked in those who had survived for a few days. In them, also, I have noted congestive distension of the large venous trunks in the abdomen with dark, fluid, tar-like blood. With this engorgement of the veins there were present engorgement of the liver, and engorgement of the inferior lobes of the lungs, from the extravasation of this tar-like blood into the parenchymatous tissue.

This combination of engorgement of the venous system, extending to the solid viscera, with engorgement of the capillary network of vessels supplying the mucous membrane of the intestines, seldom existed, except in the severest type of cholera, and in those who had struggled on for three or four days. In the majority of cases, however, where death has occurred between twenty and twenty-four hours after the first evacuation of rice-water fluid from the bowels, distension of the large venous trunks, and distension of the right cavities of the heart with dark, fluid, tar-like blood, have not been attended invariably with venous engorgement of the solid viscera.

The gall-bladder has been found, in some, full and distended with black, treacle-like bile, staining paper of a dark bottle-green tinge. In others the gall-bladder contained a small and insignificant quantity of viscid bile. In none, however, could it be asserted that there existed a morbid condition of the bile, or a morbid condition of the structures of the liver, sufficient to account for the patient's death. In several instances, where cholera proved rapidly fatal, so far from the liver having con-

tributed towards the patient's death, no organ in the body appeared to be in a more healthy condition.

No. I.—Sir ——, Bart. died in England from the effects of cholera. It was not in the power of medicine, nor in the skill of his physician, to have saved his life. I was invited to be present at the post-mortem examination of the body. The autopsy was made thirty hours after death. The mucous membrane of the stomach and bowels exhibited a pale bluish colour, and appeared somewhat tumefied. Between the fingers, the coats of the stomach and intestines felt velvety and doughy. The internal surface of the intestinal canal was besmeared with a thin gum-like fluid. The more solid contents of the canal, as far as the colon, resembled the thick sediment of barley-water. With the edge of the scalpel, the thick, viscid, tenacious exudation, was easily scraped off. With the exception of a few straggling, turgid veins, there was not the trace of a blood-vessel visible. The lungs were healthy. The brain was healthy. The solid viscera of the abdomen were healthy. The blood in the large veins, and in the right cavities of the heart was fluid. In colour it was dark. In consistence it was ropy and tar-like.

No. II.—Seetauram, a Hindoo cooly, was the subject of cholera. He had been experimented upon with medicines reputed to be infallible specifics. To the dismay of the prescriber of such popular delusions, he died. If his death had not been accelerated, his life certainly was not prolonged by the free administration of the doses puffed abroad as potent specifics. The body was examined. The pathological appearances in the stomach and small intestines differed in no essential degree from those noted in the baronet's case. The autopsy was made twenty hours after death. Between Seetauram, the cooly, and Sir ——, the Baronet, his fellow-subject in England, this disease, cholera did not draw a line of distinction, so far as the morbid changes in the fluidity of their blood,—so far as the serum-effusing, lymph-exuding, and mucus-secreting condition of the mucous membrane of the stomach and bowels were concerned.

No. III.—Shaik Kurreem Bux, a well-built Mussulman, struggled on to the third day against the effects of cholera. The body was examined between twenty and twenty-four hours after death.

The capillary network of intestinal vessels encircling the *duodenum, jejunum, and ileum intestines* was brought to view, from distension with the colouring particles of the blood. On the surface of the mucous membrane this engorgement was apparent. The internal surface of the stomach was coated over with a layer of thick glutinous inspissated mucus, semi-transparent, and resembling a thick solution of isinglass. Clusters of vessels gorged with blood were noticed on the upper and under surfaces, at the convex and concave margins, at the cardiac and pyloric orifices. The small intestines were loaded with a thick, gruel-like fluid, a compound puddle or mixture of serum, of mucus, of lymph, and of the saline ingredients of the blood, all blended together. The large intestine was distended with a fluid substance of less consistence, turbid, and resembling the sediment of barley-water. Portions of the intestine were cut across, and removed. From the internal surface of the gut, this turbid secretion of seromucous fluid trickled away. The coats of each section of the intestine felt tumefied, velvety, and doughy between the fingers. In the first division of the duodenum there was more intense vascularity than in any other portion of the intestinal tube. The mesenteric and other veins were gorged with blood. The liver, spleen, pancreas, and kidneys were healthy.

The question may be asked—In a pathological view of each of these cases, what was there to account for death after a few hours' illness? Sir ——, the Baronet, Seetaram the Hindoo cooly, and Shaik Kurreem Bux, the well-built Mussulman, were in robust health previous to the attack of cholera. Our tenure of life must be uncertain indeed, if a gush of seromucous fluid from the bowels is sufficient to extinguish it for ever.

Other cases will be enumerated hereafter to prove that from the period of time allowed to intervene between the patient's death and the examination of the body, we can have but a

faint idea of the mischief which has heen in active operation during life. Upon reflection, the most sceptical will he forced to admit that the cause of surprise should he, not that death ensued so rapidly, hnt that life should have been prolonged during so many hours.

Let us contrast the pathology of cholera, so nnsatisfactory to the eye in the preceding cases, with that of other diseases, in which the immediate and direct causes of the patient's death were disclosed, and at once explained.

Case IV.—*Extravasation of muco-sanguineous fluid into the small intestines.*

Emaum Khan died in severe pain, suddenly and unexpectedly. To all appearance he had heen in perfect health seven or eight hours hefore he was seized with vomiting and pains in the abdomen. In the examination of the body, the small intestines, from the pyloric extremity of the stomach to a point within five or six inches of the cæcum caput coli, appeared distended with fluid, and changed in colour from pale white to purple. The intestines when slit open discharged a thick, tenacious muco-sanguineous fluid, closely resembling in appearance fluid black-currant jelly. All the coats and tissnes of the intestines were deeply dyed. The blood in the veins was fluid, ropy, and tar-like. The gall-bladder was distended with bile, but there were not any morhid changes apparent in the structures of the liver, spleen, pancreas, and kidneys. The bladder was empty.

Soon after the seizure of pain in the abdomen, the pulse sank; a cold clammy sweat broke out over the hody. The voice hecame inarticulate. An insatiable thirst for cold water denoted the internal mischief which was then in progress. He had not had a discharge of any kind from the howels.

Case V.—*Extravasation of sero-sanguineous fluid into the small intestines and peritoneal sac.*

On the 12th July, 1846, I assisted in making a post-mortem examination of Kunei, a driver attached to the 3d Company of Artillery, Gwalior Contingent.

The abdomen was distended and tympanitic. When the transverse section of the parietes was completed, a quantity of reddish-coloured fluid gushed out. Within the peritoneal sac, and lodged in the pelvic fossa, the quantity of this sero-sanguineous fluid appeared to us to be equal to two, or two and a half, pints. The viscera, viewed in situ, exhibited the following appearances:—The peritoneal surface of the liver, stomach, and spleen, was smooth and glistening; free from disease. In the middle division of the abdomen, the small intestines and mesentery presented a livid, dark-red, purplish colour, as if they had been steeped for some time in the lees of port-wine. The peritoneal coat of the intestines, although polished and shining, was changed in colour, from pale white to a dark livid, purplish hue. This membrane, when detached from the other coats of the intestines, retained the same dark livid colour. Throughout the entire length of the small intestine, from the duodenum to the caput coli, the external appearance and the purple colour of its coats presented no variety.

The stomach, when slit open from the cardiac to the pyloric extremity, was found healthy. The upper portion of the duodenum, close to the pylorus, was inflamed in a slight degree. Beneath the mucous membrane, numerous small, circular, sanguineous clots were visible. At the lower division of the duodenum the mucous membrane was tumid, velvety, infiltrated with sanguineous fluid, and stained of a dark red colour; underneath the mucous membrane of this portion of the duodenum, the colour of the subjacent structures was one continuous sheet of deep redness.

The small intestine, throughout its entire extent, from the duodenum to the colon, was distended with a thin, dark, fluid substance. Ligatures were applied to the upper, middle, and lower divisions of the intestine. From each portion when slit open this same dark fluid substance flowed in a stream. In colour and consistence it bore a striking resemblance to fluid black-currant jelly; mixed with water or spirits, it communicated a dark red colour to each. Rubbed over paper, it left a deep red stain: rubbed between the fingers it stained the skin

blood-red, hut possessed no odour. So deeply dyed were the mucous, sub-mucous, muscular, and peritoneal coats of the dnodennm, jejnnum, and ileum intestines, that throughout their entire course there could not be discovered a single inch of membrane of a pale healthy colour.. This purple discolouration extended as far as the large intestine. Three inches above the valves of the cæcum caput coli, the deep purple colour of the membranes terminated abruptly. From this point it partook rather of a bright crimson red. In the remaining portion of the intestinal canal, the mucous membrane appeared pale and healthy. The blood in the abdominal veins was in a fluid state.

Symptoms on admission.—On the 11th of July, this artillery-driver was brought into hospital, from the lines, at 5 o'clock in the evening. He was pulseless. His extremities were cold. The body was covered with a cold, clammy sweat. He suffered from cramps, and violent pains in the abdomen, increased by the slightest degree of pressure. His voice was hollow. His breath cold. His tongue moist. The constant call for cold water to quench his thirst was a prominent symptom in his case. The abdomen was tense, distended, and tympanitic. On his way to the hospital he had vomited once or twice.

On the morning of the 11th he was present at parade as usual. After dismissal from parade he returned to the Artillery Lines at 8 o'clock A. M. At 11 o'clock A. M. he felt a griping pain in the abdomen, which gradually became more violent, and was accompanied with vomiting. At 3 o'clock P. M. one of his comrades went into his hut, and found him suffering from cramps, and in violent pain. At 7 o'clock P. M. he died. Thus, between the first attack of pain in the stomach and his death, not more than eight hours and a half had elapsed.

Case VI.—*Extravasation of muco-sanguineous fluid into the small intestines.*

Gunga Deen Tewarry, the favourite servant of his master, hathed at 10 A. M. In half an hour afterwards he was seized with cramps in the stomach, and violent pains in the abdomen.

These pains became so acute that he lay writhing on his back. He was treated actively, but died in the evening. During the progress of the disease the pulse was full and bounding,—hard, contracted, and wiry,—small, flickering, and at length disappeared. The abdomen became tense, painfully blown out. He suffered from cramps in the extremities, from occasional vomiting, but not from purging.

In the post-mortem examination of the body there was a blush of inflammation at the pyloric extremity of the stomach: in other respects this viscus was healthy. The duodenum, jejunum, and ileum intestines were discoloured; their peritoneal surface was stained of a deep purple hue, but there was not any fluid extravasated into the peritoneal sac. The intestines were distended with a dark fluid substance, which stained the fingers red: in consistence it was thick, tenacious, viscid. As this inodorous claret-coloured substance dropped from the internal surface of the small intestines, it resembled fluid black-currant jelly. All the coats of the intestines presented an uniform deep purple or violet colour, so completely had they been dyed. There was no thickening of the mucous membrane. The large intestines appeared healthy, as did also the solid viscera in the abdomen.

Pathological anatomy revealed to us the immediate and direct causes of the rapidly fatal termination of the disease in these cases. Pathology pointed out in plain and convincing language that death was caused by certain morbid changes in the structures of the small intestines, and by certain morbid changes in the fluid circulating through the capillary network of the intestinal vessels. Upon these lesions, easy of demonstration, the finger of the anatomist was placed with certainty, and without difficulty.

Why is it not thus in the Indian Village Cholera? Why can we not point with equal confidence to pathology, to clear away all doubt as to the seat of the disease? The question admits of repetition.

Were the sero-mucous discharges from the mucous membrane and subjacent tissues eliminated in such profuse quanti-

ties in cholera, tinged with the colouring matter of the blood, —were the membranes dyed of a deep, purple or violet colour, instead of being pale, soft, shrunk, or shrivelled,—anatomists would not hesitate to declare that the pathology of the Indian village cholera was clear, simple, demonstrable. The collection of half a pint, or of a pint, of blood-red fluid would be a convincing proof that the seat of the disease, the scource of the symptoms, the immediate and direct cause of death, were in the mucous membrane and subjacent tissues of the stomach and intestinal tube, and in these alone.

The elimination of muco-sanguineous fluid from the internal surface of the duodenum, jejunum, and ileum intestines, proved fatal in the cases recorded. I have never met with cases of cholera in which death ensued so quickly. Were this form of disease to become endemic or epidemic, the Indian village cholera, with its terrors, would be thrown completely into the shade: so much more serious in its consequence is that form of disease in which sero-sanguineous and muco-sanguineous fluids are exhaled from, secreted by, or exuded through, the several component strata of tissues of the stomach and intestinal tube.

The extravasation of muco-sanguineous fluid into the small intestines is not difficult of explanation. From some cause unknown the balance of circulation in these intestines is lost. A determination of blood towards the parts is excited: the quantity of blood attracted to the surface proves to be excessive. The capillary network of vessels, gorged beyond the power inherent in their coats to retain the circulating fluid, finds relief in that process of nature by which the blood percolates through the tissues and membranes of the intestine, and finally lodges in the intestinal tube, or in the sac of the peritoneum. Thus it was in the case of the artillery driver: thus it was also in the case of Gunga Deen Tewarry, the servant; and (may we not also state?) thus it is in cholera, where the colourless portion of the blood percolates through the component strata of tissues of the stomach and intestinal tube.

Are we, then, justified in pronouncing the pathology of the

disease obscure, because, in the majority of cases where death has taken place between twenty and twenty-four hours, there cannot be detected the trace of a blood-vessel,—because there is a total absence of all those appearances of vascularity, of intense and deep-seated redness, of distinct and circumscribed violet-coloured patches of blood, with which our ideas of inflammation of the membranes have been familiarised? Are we, I repeat, justified in pronouncing the existence of sero-mucous fluid,—the existence of a creamy, pultaceous, abnormal secretion,—and the existence of a thick, viscid, inspissated mucus in the stomach and intestinal tube, insufficient pathological evidences of the disease, cholera, being dependent on a fretted, and irritable, and sero-mucous eliminating condition of the tissues of the intestinal canal endued with vitality?

Distinctly, I assert, we are not justified, unless we consider as inseparable from a fretted and irritable condition of the membranes of the stomach and intestines that degree of redness, that deeply-dyed purple colour of the tissues, from the infiltration of blood and serum. If, on the contrary, we rest satisfied that this sero-mucous eliminating condition of the membranes of the stomach and intestines—the characteristic feature of the Indian village cholera—can exist, and in reality does exist, without the slightest discolouration of the membranes, and without the trace of a blood-vessel being visible, we may safely aver, the evidences are strong—the proofs are convincing—that in the tissues of the stomach and intestinal canal endued with vitality, and in these alone, is the seat of the disease cholera.

What need we more from pathological anatomy?—Nothing, save the corroborative proof afforded by the morbid appearances of the mucous membrane and subjacent tissues when the stomach and intestinal canal have been slit open within one or two hours after death.

The following cases, but Case X. in particular, appear to me to bear so directly on the question, that no longer can any doubt be entertained as to the seat of cholera:—

Case VII.—*State of the stomach and intestinal canal.*

A murderer, Bhola by name, died from the effects of cholera on the 9th of October, 1849. He was a prisoner, confined in the jail at Lullntpore, and had suffered from the symptoms of cholera in its second stage about five weeks previously. He recovered from the effects of the first, and died from the effects of the second attack.

Nine hours after death the stomach and intestinal canal were slit open: the internal surface of the former was coated over with a thick, glntinous, semi-transparent mucus, easily detached from the epithelium of the mncous membrane by a jet of water. The mucous membrane was pale and tumefied. On the posterior wall, however, there existed some patches of vascularity. The vessels were gorged with crimson-red hlood. This vascularity of the suh-mucous tissnes partook of a dceper colour for one inch within the stomach, close to the pylorus, and for two inches on the duodenal side of the pyloric orifice. In this first division of the dnodenum, the crimson-red injection of the mucous membrane and subjacent tissnes was more strongly marked than in any other portion of the intestinal canal.

The gut was distended with serum, mucus, and lymph, blended together; forming a fluid secretion, which in colour and consistence resembled thin oaten gruel. The surface of the mucous membrane was besmeared with a secretion, glutinous and semi-transparent, which, when washed away, exposed to view the faded rose-coloured tint of the sub-mucous tissncs. On closer examination, a network of minute hlood-vessels, gorged to excess, was noticed hetween the folds of tbe mucous membrane. Some intumescence of the membrane was caused by the infiltration of serum into the snb-mucous tissnes.

Jejunum and ileum.—In the former, the contents, consisting of a thick gruel-like secretion, and the diffused pinkish redness of the mucous membrane, differed in no respect from the ahnormal appearances met with in the duodenum. The internal surface of the ileum was coated over with a layer of thick inspissated mucus, semi-transparent, and resemhling a thick

solution of isinglass. This exudation adhered so tenaciously to the surface that it could not be washed off except by a forcible jet of water. The mucous membrane and subjacent tissues were injected of a vermilion-red colour. Throughout the whole extent of the duodenum, jejunum, and ileum intestines, the glandular bodies were prominent, and appeared irritable, tumid, and vascular, forming points towards which converged minute vessels injected with crimson-red blood.

Colon and rectum.—The internal surface of each, like that in the ileum intestine, was coated over with a quantity of thick, tenacious, glucy mucus, semi-transparent, and resembling a strong solution of isinglass. The colon was distended with a thin sero-mucous secretion of the same description as that passed during life. The capillaries were gorged with blood; the mucous membrane was dyed of a deep red colour.

The liver, spleen, pancreas, and kidneys, were healthy: they were free from engorgement. The bladder was empty and contracted. The secretion of urine was suppressed from the onset of the disease. The functions of the kidneys had been suspended.

Lungs.—The inferior lobe of the right lung was gorged with blood; it had lost all crepitation under pressure; its colour was dark purple. When incised, a quantity of fluid tar-like blood exuded from the cut surfaces. The middle lobe was gorged with blood, but not to the same extent as the inferior lobe. The superior lobe was healthy. The left lung was similarly engorged, but not to the same degree as the right. The mucous membrane of the bronchial tubes was stained of a dark red colour. The large venous trunks and the cavities of the heart were distended with fluid tar-like blood. The muscular parietes of the ventricles were firm and healthy.

Symptoms on admission.—Pulseless. The powers of life were depressed. The colour of the lips and gums, of the fingers and toes, compared with other parts of the body, was deep *indigo blue. The surface of the body was cold.* A *clammy* sweat was oozing out over the head, neck, and chest. Thirst was insatiable. The cramps of the muscles were confined to

the legs and thighs. The eyeballs were sunken into the sockets. His voice was hollow and feeble. The rice-water discharges trickled away from the bowels. The abdomen was pinched backwards towards the spine; and was doughy or inelastic under pressure. Restlessness and anxiety, and the tossing about of his arms and legs, were marked features in his case. The secretion of urine was suppressed.

The impulse of the heart could not be felt: its action was rapid and feeble; the sounds resembled the distant ticking of a watch. This change could not be attributed to any defect in the muscular energy of the ventricles, nor to any lesion in the muscular fibres. The change in the action and sounds of the heart arose from the insignificant quantity of blood which flowed towards the heart, and passed through the auricular and ventricular cavities, for circulation through the system. The seizure was of eight hours' duration before he became completely prostrated and was removed to the hospital.

CASE VIII.—*State of the stomach and intestinal canal.*

Twelve hours after death.—The stomach and intestinal canal of Sona were slit open. He was a prisoner in the jail at Lullutpore, and had died from the effects of cholera on the 9th October, 1849.

The surface of the mucous membrane of the stomach was coated over with a viscid, tenacious, gluey or gelatinous exudation of mucus and lymph. With the exception of a few circumscribed patches of a vermilion-red colour, the mucous membrane was pale. There was some intumescence of the coats, from the infiltration of serous fluid into the sub-mucous cellular tissue, but there was not the slightest approach to softening. Close to the pyloric orifice of the stomach, for one inch within the stomach, and for two inches on the duodenal side of the pylorus, the mucous membrane and subjacent tissues were dyed of a deep crimson-red. The capillaries were injected with the red particles of blood. They were gorged to excess. Beyond the first division of the duodenum, the mucous membrane of the intestine exhibited a faded rose or pink co-

lour. Flakes of lymph and of inspissated mucus were lodged between the folds of the mucous membrane. The fluid contained in the duodenum and jejunum intestines consisted of serum, mucus and lymph, blended together, forming a thick gruel-like puddle.

In the jejunum and ileum intestines, the rose-coloured blush of the epithelium, of the superficial stratum of mucous membrane, and of the subjacent tissues, was less faded than might have been expected. In the ileum there existed numerous patches of intense vascularity. The capillaries close to the surface, and the capillary ramifications between the strata of sub-mucous tissues, were gorged with blood. The fluid contained in the ileum differed from that in the duodenum and jejunum intestines: it was straw-coloured, thin in consistence, and more serous in its general appearance.

The glandular bodies of every description imbedded in the tissues of the stomach, of the duodenum, jejunum, and ileum intestines, were prominent to the eye: they appeared tumid, irritable, and considerably distended. In several parts of the canal the excretory ducts of the glandular bodies participated in the state of general inflammation. Their mouths were swollen, pouting, and unusually wide or patent.

The rose-coloured efflorescence, diffuse and continuous in the jejunum intestine, had completely faded in the colon and rectum. Some slight engorgement of the capillaries remained to denote that the mucous membrane and subjacent tissues in the large intestines had not escaped the universal attraction of blood to the surface, and the subsequent elimination of serum, mucus, and of lymph. The fluid contained in this division of the tube resembled in every respect the rice-water discharges passed from the bowels during life. Flakes of lymph and mucus adhered to the surface of the mucous membrane.

The liver, spleen, pancreas, and kidneys, were healthy in their structures: they were free from engorgement. The bladder was empty and contracted. The gall-bladder contained some thin, black, pitch-like bile, which, when rubbed between the fingers, left a dark bottle-green stain.

The lungs crepitated under pressure: a crimson redness was diffused over their external surface, including the pleuræ. The lower lobes were purple in colour, from engorgement with fluid, black, tar-like blood. This, the uncoagulated and coloured portion of the blood, had become extravasated into the parenchymatous tissue towards the termination of the case. The cavities of the heart contained a small quantity of dark fluid blood.

The symptoms under which this prisoner laboured, when removed to the hospital for medical treatment, differed but slightly from those recorded in the murderer's case.

CASE IX.—*State of the stomach and intestinal canal.*

Seventeen hours after death, the stomach and intestinal canal of Poonooa were slit open. He was a prisoner in the jail at Lullutpore, and had died from the effects of cholera on the 7th October, 1849.

The stomach contained a small quantity of turbid fluid. Over the greater part of the internal surface, the mucous membrane was pale. On the posterior wall, beneath the mucous membrane, circumscribed patches of a bright scarlet colour existed: these patches were in small circles, and were formed by minute scarlet points clustered together. The capillaries, gorged with red particles of blood, branched out into an arborescent form between the strata of tissues. A small quantity of thick inspissated mucus, formed into pellets, had collected close to the pyloric orifice. The mucous membrane was somewhat tumefied, but retained its firmness. The intumescence arose from the infiltration of serous fluid into the sub-mucous cellular tissue. With the edge of a scalpel, or of a spatula, a quantity of thick, inspissated, ash-coloured mucus was collected from the internal surface. In some parts this glutinous exudation adhered tenaciously to the epithelium, and, when separated by a jet of water, exposed to view the spongiole or flossy surface of the epithelium. In other parts the exudation of glutinous mucus adhered but loosely to the epithelial surface of the mucous membrane.

The duodenum was distended with a cream-coloured fluid, thick in consistence, and resembling oaten gruel. This characteristic cholera-puddle was formed by the intimate blending together of serum, mucus, lymph, and the saline ingredients of the blood. In the first division of the gut a more marked degree of vascularity prevailed than in any other part of the intestinal tube. Almost invariably the vascularity remains in this section of the duodenum, although it may have faded in the stomach and in the jejunum and ileum intestines. The mucous membrane on the anterior wall of the duodenum in the second and third divisions was pale. On the posterior wall it retained a faded pinkish tint. There was slight intumescence, from the infiltration of serous fluid into the sub-mucous cellular tissue. Between the folds of mucous membrane, flakes of lymph adhered to the surface. The shreds were soft, inorganized, and recently effused. The condition of the jejunum intestine corresponded in every respect with that of the second and third divisions of the duodenum.

The ileum was distended with a straw-coloured fluid, clear and serous in appearance. That which flowed away from the gut was unmixed with flakes or shreds of lymph and mucus. The rose-coloured or pinkish tint of the mucous membrane was more distinct than in the jejunum. The minute capillaries, gorged with blood, formed arborescent vascularities beneath the mucous surface. There was no apparent intumescence of the mucous membrane. Externally, or towards the peritoneal cavity, the blood-vessels ramifying between the folds of the mesentery, and the coats of the intestines were gorged with blood.

The colon and rectum were distended with fluid, which, unlike that in the ileum, resembled the sediment of rice-water or barley-water. Between this fluid contained in the large intestine, and the rice-water discharges passed during life, there was not any difference. Patches of vascularity existed here and there in the colon, and also in the rectum; but, in other respects, the mucous membrane and subjacent tissues appeared healthy, when a stream of water cleared away the slimy mucous with which the surface was besmeared.

The glandular bodies in the stomach, duodenum, jejunum, and ileum intestines, were swollen. They were unnsually prominent. The mouths of the excretory ducts were distinctly visible in several places. On close examination, the glands formed points, towards which from three to four red lines, or capillaries, converged. There could not be a doubt that their swollen and distended state arose from irritability and inflammation.

The liver appeared healthy. When sliced, a small quantity of blood flowed from the veins. The bile in the gall-bladder was thick and tar-like. When rubbed on paper or between the fingers, it left a dark bottle-green stain. The spleen, pancreas, and kidneys, were healthy. The bladder was contracted; when slit open, it did not contain a single drop of urine.

The right cavities of the heart were distended with fluid, tar-like blood. The muscular structures of the auricles and ventricles were firm and healthy. The posterior part of the inferior lobe of each lung was gorged with fluid blood. The mucous membrane of the bronchial tubes was intensely vascular.

Symptoms on admission.—The extremities were stiff and cold. The muscles in the calves of the legs, in the arms and hands, suffered from spasmodic contractions. At times the contractions were so violent, that the muscles were twisted into round hard balls. The pulpy extremities of the fingers and toes were shrivelled, whilst the colour of the skin had changed from black to a deep indigo blue. Heat remained in the surface of the body about the chest. Thirst was insatiable. He had vomited, and had been purged several times, before removal to the hospital. The discharges from the stomach and from the bowels were sero-mucous, or such as resembled rice-water. The gush of fluid from the bowels occasioned little or no pain. The quantity passed on one occasion, after having been in hospital about half an hour, amounted to nearly two quarts. The pulse was flickering at the wrist, but could be felt: the beats were so rapid that they could not be counted: the vibration under the finger was weak and thready. The duration of his illness, according to his account, did not exceed six hours.

At 12 o'clock P. M. the symptoms were more unfavourable. Large drops of cold sweat had oozed out on the forehead, the neck, and the chest. The temperature of the body had fallen. The breath had become cold; the tongue was cold. The eyes had shrunk into their sockets, but were bright. His intellectual powers were clear. In a hollow and scarcely audible voice, he asked for a relative to be admitted into the jail to see him, as he had only a few hours to live. The pulse had ceased to beat at the wrist. The impulse of the heart could not be felt: its action was rapid and indistinct: the sounds resembled the ticking of a watch. The breathing also had become laboured. The vomiting and purging of rice-water fluid continued, but was less in quantity, and not so frequently passed from the bowels. He died shortly after this report was taken.

CASE No. X.—*State of the stomach and intestinal canal.*

One hour and a half, after death the stomach and intestinal canal of Dowriow Sing were slit open, from the œsophagus to the rectum. He was a prisoner under trial, who had died from the effects of cholera on the 7th of October, 1849.

The stomach contained a small quantity of gelatinous fluid. The surface of the mucous membrane, from the cardiac to the pyloric orifice, on its concave and convex curvatures, on its upper and under surfaces, exhibited a diffused blush of bright crimson redness, somewhat less marked in depth of colour than the incipient blush of scarlet redness by which the first stage of erysipelas is indicated. The vascularity of the mucous membrane was uniform,—that is, the scarlet efflorescence was equally diffused over the surface. The free surface of the mucous membrane was coated over with a layer of tenacious glairy mucus, semitransparent, and of a jelly-like consistence. This exudation of ropy mucus was greater in quantity, and firmer in consistence, on the posterior wall, or depending part of the stomach, than elsewhere. When raised on the edge of the scalpel, the strings, or glutinous shreds, remained attached to the mass of mucus adhering to the coats of the stomach. The surface of the mucous membrane on the anterior wall

appeared as if it had been smeared over with a thick solution of isinglas.

This exudation of mucus, with shreds of lymph intermixed, when removed by a forcible jet of water, exposed to view the crimson redness of the mucous membrane and subjacent tissues, with a flossy and irritable condition of the epithelium. The mucous membrane was firm, without the slightest approach to softening, but tumid and velvety, from the infiltration of serous fluid into the submucous cellular tissue. The veins on the external or peritoneal surface were gorged with fluid blood.

The duodenum and jejunum intestines were distended with a saffron-coloured fluid. It trickled away from the interior of each gut in a thick stream. In consistence it resembled thin porridge, or oaten gruel; in composition, it was formed by the intimate blending together of serum, of mucus, lymph, and the saline ingredients of the blood. Flakes of lymph adhered to the folds of the mucous membrane, and the internal surface was coated over with a thin layer of glairy semitransparent mucus. The fluid contained in the ileum intestine, on the contrary, was thin and clear, and straw-coloured, purely serous; whilst, in the large intestine, from the cæcum caput coli to the rectum, the fluid was muddy white, devoid of odour, loaded with flakes of mucus and lymph, and resembled the sediment of barley-water. In every respect it corresponded with the rice-water stools passed from the bowels during life.

The deep rose-coloured tint, or crimson-red blush, prevailed throughout every part of the intestinal tube. The mucous membrane, and subjacent tissues in the ileum and in the colon, even to the lower flexure of the rectum, exhibited the scarlet efflorescence, or erysipelatous blush, as strongly marked as that noticed in the stomach and duodenum. In the small intestines the epithelium was flossy. Its spongioles stood out erect, and were dyed of a deep pink colour. Flakes of inspissated mucus, and of plastic lymph, adhered to the folds of mucous membrane. Although these flaky exudations of lymph were easily removed by a jet of water, yet the crimson redness of the tissues remained. The mucous membrane appeared tumid. The coats

of the small intestines felt velvety between the fingers, in consequence of the infiltration of serous fluid into the submucous cellular tissue. The vessels on the external or peritoneal surface were gorged with fluid blood.

The glandular bodies of every description, embedded in the submucous tissues, and scattered throughout the stomach and intestinal canal, appeared tumid, vascular, irritable, and distended with fluid. Without the aid of a lens, the mouths of the excretory ducts appeared swollen and pouting; and, in those spots where the vascularity was most intense, the excretory ducts not only gaped widely, but the gland formed a point towards which a number of minute vessels, gorged with blood, converged.

The blood contained in the large venous trunks was in a fluid state, dark, tar-like, and uncoagulated. The structures of the liver were healthy. The gall-bladder was distended with viscid pitch-like bile. The kidneys, pancreas, and spleen, were healthy. The bladder was contracted and empty. It contained a few bubbles of air mixed with mucus, but not a drop of urine.

Symptoms on admission.—Between 11 and 12 o'clock P. M. Dowriow Sing was removed from the jail to the hospital. In the early part of the day he had been seized with vomiting and purging of rice-water fluid. Being a Thakoor of powerful muscle, he held out against the attack in the first instance. When seen by me he was in the third stage of cholera. His extremities were cold. The surface of the body was cold. The pulpy extremities of the fingers and toes were shrunk and shrivelled. The hands and feet had changed in colour from black to a deep indigo blue. The eyes had sunk into their sockets. The skin of the face appeared pinched. The breath was cold: the tongue also was cold at the top and at the sides. A stream of rice-water fluid trickled away from the bowels without his knowledge. He experienced no pain in the abdomen. The quantity of fluid collected in the earthen pot under his bed, had it been measured, would have exceeded two quarts: it was loaded with a flaky sediment: shreds of mucus and

lymph floated through the supernatant fluid. A small quantity of clear sero-mucous fluid was ejected from the stomach.

The muscles in the calves of the legs and thighs, in the arm and forearm, the recti muscles of the abdomen, suffered from violent spasmodic contractions. These muscular spasms, and an insatible thirst formed his chief complaints. A cold clammy sweat was oozing out on the forehead, the neck, and thorax. His intellect was clear; and the eye, although sunken in its socket, was bright.

The pulse could not be felt at the wrist. Feeble and thready vibrations were communicated to the finger from the arteries in the neck. The impulse of the heart could not be felt: its action was indistinct: the sounds, rapid in succession, resembled the distant ticking of a watch. This alteration in the character of the sounds of the heart, and in its action, originated in the deficient flow of blood towards the cavities, and in the convulsive efforts of the muscular fibres to propel an insignificant quantity of devitalised blood,—a fluid, thick, black, and tar-like, deprived of its due proportion of serous and saline ingredients.

All efforts to resuscitate the system failed. In turning from one side to the other to relieve a spasmodic contraction with which the muscles of one side of the chest were affected, he died.

This case, in the suddenness of the attack, in the rapidity with which the symptoms advanced to the third stage, in the failure of treatment to re-animate the system, in the morbid appearances discovered one and a half hour after death,—is as perfect a specimen of the Indian village cholera as can be extracted from my note book. Medical men who are in the slightest degree sceptical as to the seat of cholera, and as to the source of the symptoms characteristic of cholera, ought to examine within one hour after death the stomach and intestinal canal of the patient who has died from the effects of the disease. They need not then travel into the celestial regions of speculative theory to account for the globules of lymph with their discs, the globules of mucus with their discs, the infinitely varied shapes, regular and irregular, of the saline ingredients

of the secretions, being fungoid bodies. Nor need they experience much difficulty in accounting for the rapidly fatal progress of cholera when the first and second stages have been neglected or maltreated.

Treatment.—The conflicting opinions which exist amongst professional men as to the course to be pursued in the treatment of cholera, need not be quoted at length in brief notes such as these; they would be out of place here; the advantages to be derived would not compensate for the time and labour bestowed. Suffice it to state, that bleeding has its advocates and its opponents. Calomel is lauded by one, and condemned by another. Opium, in a variety of forms, is regarded by one class of practitioners as their trusty sheet-anchor; by others, opium in every shape is hooted at, and scouted, and pronounced worse than useless. Combinations of these medicines—calomel and opium, sugar of lead and opium, croton oil and opium, arsenic, arsenic and opium, hot and cold injections, stimulants in solid and liquid form, transfusion, each and all have their advocates. The infinitesimal doses of homœopathic and isopathic medicines have proved miraculously successful in the cure of cholera,—successful even beyond the most sanguine expectations of those who practise on the credulity of the public with such therapeutic delusions. Scalding hot water, and redhot pokers, are not without admiring advocates. Surpassing every medicine hitherto prescribed in the infallibility of their specific virtues, anæsthetic agents, ether and chloroform inhalations, have been brought prominently to the notice of the public.

The drenching of the patient's inside with ice-water,—with ice in lumps,—and with ice sugared and pounded; the sousing of his outside in water of high and low temperature; the mummifying of his body in sheets wet, and sheets dry, and sheets medicated,—are remedial measures also strenuously advocated.

In this catalogue of anti-cholera specifics, upon which shall we fix as *the* life-preserving remedy?

When the Indian village cholera rages as an epidemic,—when that state of the atmosphere prevails which predisposes to an

attack of the mucous membranes of the intestines, in preference to any other structures in the body,—when the disease is localized, and sweeps away its victims in the course of a few hours' illness,—the first indication of the attack must be closely watched, and vigorously combated. To ensure success, and to secure to the patient the chance of recovery, the remedial agents, whatever they be, must be employed in the earlier stages of the disease.

Medicines and remedial measures which fail in restoring vigour to the system in the third stage of cholera, nevertheless may be attended with the happiest results if resorted to at an earlier period. Success is rendered still more probable if they be persevered in with diligence and with confidence.

There is no disease in which hesitation in practice,—in which a shifting, unsettled principle of medical treatment,—in which a system of tampering with the symptoms by newly-discovered specifics, is more likely to be attended with fatal consequences than in this. There is no disease which admits less of delay in its treatment. If by possibility it can be done, intercept by prompt and decisive measures the march of the disease from the first and second stages to its third or advanced stage. However trifling the symptoms may be at first, this is the object to be kept steadily in view. In this lies the secret of success in the treatment of cholera.

What practitioner, then, with the slightest pretensions to skill, and judgment, and decision in practice, will tamper with the lives of his patients, by deferring active measures of treatment until the symptoms unequivocally declare that the disease has progressed to its third stage? He who promptly brings his remedial measures and therapeutic agents to bear upon cholera in its earlier stages will be able to exhibit a list of cases successfully treated, more numerous, and more satisfactory, than the practitioner who flies from one new specific to another, and thus coquets with the disease, until the symptoms speak forth in stern language, that the hours of his patient are numbered. His efforts to invigorate a system from which life is fast ebbing, must prove abortive. To his vacillation in prac-

tice must be attributed the loss of the main chance in arresting the onward progress of the disease.

These truisms, simple though they be, cannot be dwelt upon with too strong an emphasis. They cannot be impressed too deeply on the minds of medical men lately arrived in India, who cannot have had practical experience, on an extensive scale, of this scourge of the human race in this country. They cannot be placed too prominently, nor too frequently, before the eye of the public. The safety of human life depends in no small degree upon their observance.

The use of the lancet.—The first measure in the course of treatment which calls for notice is general bleeding. Should the cholera patient be seen immediately after the first evacuation of rice-water fluid from the stomach, and of rice-water fluid from the bowels, the question of venesection demands from the practitioner his earnest attention. From the use of the lancet much good or much evil may accrue to the patient.

Its indiscriminate employment in all cases, and under all circumstances, by some practitioners, has brought venesection in cholera into disrepute. This was the error into which Annesley fell. In the majority of cases treated by him, Annesley practised bleeding with success; and in consequence of such success he has recommended venesection to be employed at all times, and under all circumstances. Open a vein, and let the blood trickle, if it should not flow, until the colour changes from black to red. This was his rule.

"*Bleeding,* therefore, when it can be effected, should never be lost sight of. The object being to diminish the quantity of this fluid in order to relieve the heart and lungs from oppression, and to enable them to perform their functions. This object, however, can only be attained in the early stage of this disease, and before the circulation ceases at the wrist; the necessity, therefore, of early assistance is manifest, because after this period, blood will seldom flow from the veins, and when it does, the quantity is generally too small to afford relief. I have sometimes seen 16—18—and even 20 ounces of blood flow languidly, and in a very thick stream from the veins,

then the bleeding stop suddenly and the patient sink at once. —In these cases, I have considered that the quantity of blood thus taken was merely that which had remained in the veins, after their circulation had been arrested, and that the bleeding ceased, when the veins were emptied. This circumstance has led to various opinions upon the propriety of bleeding, and has induced some to infer that death was accelerated by it. This may have been the case in some instances: but I conceive that the disease was then so far advanced, that death would have been the consequence under any circumstance, though probably hastened by the operation. I have, however, seen instances, wherein blood, drawn even in the advanced stage of this disease, has continued to flow till the balance of circulation was restored, and the patient recovered. In these cases the blood was at first thick, black and came away in drops: at length it became thinner and flowed with more ease, till the colour changed to a bright red. This is the change which should always be looked for, and whether it take place after the abstraction of one ounce or thirty, is of no consequence. This change must supervene before the patient can be considered safe. Under all circumstances, therefore, I think we should never forego a trial of the lancet.

Although, I recommend bleeding to be attempted at all times, and in every stage of the disease, I am fully aware that many cases have recovered where it has not been used at all: nor do I answer for its universal success; but I do venture to assert, that, if it can be accomplished in the early stage of the disease, and before the circulation has ceased at the wrist, in nine cases out of ten, it will prove successful, especially, if the colour of the blood change from black to red, if the pulse get up, and the spasms be relieved.

Whilst I consider it a point of great importance to remove oppression of the system by the abstraction of blood, it must not be imagined, that this means alone will cure the disease. There are other aids also essential. The object of bleeding is to remove venous congestion and spasm; to relieve the heart and lungs from oppression, and to check the most urgent and

distressing symptoms; and without this be in some measure attained, all our efforts will prove fruitless: but this having been once accomplished, the disease is brought into a manageable state, though it not unfrequently happens, that our most active efforts are afterwards required to remove a very opposite state of the disease, nearly as dangerous as the former, occasioned by the reaction which occurs, under a state of system unfavourable to its development."—*Annesley's Diseases of India*, 2nd edition, pages 502-3.

Twining, in like manner, practised general bleeding in cholera with success, and has recommended its use. Venesection, in his practice, was not employed without discrimination. He restricted the use of the lancet to certain states of the patient, indicated by the presence of particular symptoms.

"Blood-letting, as above directed, in those cases of cholera which are attended with a febrile or inflammatory condition, and a dry tongue, is demanded by indications which are sufficiently distinct; and under such circumstances the practice is in general singularly successful, and V. S. may be deemed essential to the cure of the disease, especially if it be employed in conjunction with other appropriate remedies. Blood-letting has also been proposed and employed in the treatment of the congestive form of cholera, for the purpose of relieving the oppression of the system dependent on the accumulation and stagnation of blood in the great vessels; and for alleviating the gorged and torpid state of the capillary circulation in some organs. The free abstraction of blood would appear to be an appropriate remedy for the morbid condition now adverted to, if the principal part of the malady with which we have to contend were essentially congestive, but unfortunately, in many cases we meet with *congestion, and something more.* The best indications for employing blood-letting with precision and success, in congestive cholera, arise from the consideration of the state of the heart and arteries to act with healthy freedom. Blood-letting on the contrary rarely affords efficient relief in cases of congestive cholera after collapse has supervened at a late stage, when the patient is exhausted by long continuance of the dis-

ease, and when the system is drained of the watery parts of the blood; at the same time, that the nervous system has already sunk into a state of torpor. In fact, the abstraction of blood under such circumstances, does not remove that condition on which the important, or dangerous symptoms depend. There are many cases in which torpor, coldness, and collapse come on at the moment in the system, which is combined with, or superadded to congestion. Practically, it is often a matter of great difficulty to use the lancet in all those cases which will derive benefit from it, and in no others. As a general rule we may say that V. S. is useful in most cases in which congestion takes place early, and is attended with violent and painful spasms, more especially, if there be warmth of the surface, and the action of the heart and arteries be not too much impaired. Under these circumstances, the system still retains a degree of sensibility, action, and power; and the abstraction of blood not only takes off the load which oppresses the vascular system, but enables the heart and arteries to act with healthy freedom. Blood-letting on the contrary, rarely affords efficient relief in cases of congestive cholera after collapse has supervened at a late stage, when the patient is exhausted by long continuance of the disease, and when the system is drained of the watery parts of the blood; at the same time, that the nervous system has already sunk into a state of torpor. In fact, the abstraction of blood under such circumstances, does not remove that condition on which the important or dangerous symptoms depend. There are many cases in which torpor, coldness, and collapse, come on at the moment of the invasion of the disease; and in these subjects, we derive no benefit from taking away the mechanical obstruction caused by stagnation of the blood, unless we can restore vital energy, excite arterial action, and promote a healthy state of the secretions. For this reason, we find that blood-letting even in the early stage of that form of cholera, in which asphyxial symptoms predominate, is not generally useful, and is often injurious. In the mixed cases of cholera, the judicious employment of blood-letting, in combination with stimulants, and one or two doses of opium, affords

the most successful results."—*Twining's Diseases of Bengal*, Vol. III. pp. 42—44.

The authority of such men as Sir James Annesley and Dr. Twining, as to the value of the lancet in the treatment of cholera, cannot be questioned. Their opinions were deduced from the accumulated experience of years, and as such they have placed them on record.

The practice of blood-letting in cholera must be regulated by the pulse and constitution of the patient, as well as by the stage of the disease. It is useless to lay down stringent rules for the guidance of the profession, as to when the lancet ought to be employed, and as to when the lancet ought not to be used. The medical man, at the patient's bed-side, can alone decide whether general bleeding would prove injurious or beneficial. Upon his judgment, based on experience, must rest the responsibility of prescribing or withholding the lancet.

Venesection, when prescribed by me in the treatment of cholera, has not realised the expectations entertained of its utility. This was particularly the case when employed in the second and not in the first stage of the disease. In the third stage, the opening of a vein for the purpose of abstracting blood has positively hastened the patient's death. The use of the lancet will prove injurious, if, with the cessation of the pulse at the wrist, the impulse of the heart cannot be felt when the patient inclines to the left side. Its use is also contra-indicated, if, with the cessation of the pulse at the wrist, the action and muscular sound of the heart are indistinct, or with difficulty can be heard in the cardiac region; but the use of the lancet may not prove injurious should the impulse and action of the heart remain strong and vigorous, even after the pulse has ceased to beat at the wrist.

In importance, the use of the lancet is secondary to the rapid and extensive abstraction of blood from the surface of the abdomen. How can this object be attained? Upon what principles of treatment should this local abstraction of blood be recommended?

The symptoms and pathology of the disease have declared, in unequivocal terms, that from the internal surface of the stomach and intestinal canal a sero-mucous flooding is in active operation. Of this there cannot be the slightest doubt, unless we discredit our senses. The object to be gained by treatment, if there be any, must be to correct and to control that morbid state of the membranes and tissues which throws off this viscid, tenacious, gluey, or thin, gum-like secretion, as a necessary consequence of its deranged condition. The object of treatment must be, to strike at once at the root of the mischief, to make a quick and decided impression upon the fretted, and irritable, and sero-mucous eliminating structures of the stomach and small intestines, by the local abstraction of blood frequently repeated.

Effect that impression, and the membranes will cease to secrete. Medicines administered internally may then produce some effect upon the system. The whole contents of the intestinal canal, from the stomach to the rectum, may be swept away by drastic purgatives, or by stimulating injections; or they may be retained under the paralysing influence of narcotic and astringent drugs, but the disease will not be subdued. The membranes will not cease to secrete the less. Within an hour's time the intestinal tube will be re-loaded with the same viscid, tenacious, gluey, inspissated mucus; or with the same thin, gum-like, rice-water fluid as before. Other than this it cannot be. These secretions, the products of the disorganised state of the mucous membranes, and of the subjacent tissues, endued with vitality, will continue to be eliminated until remedial measures and therapeutic agents are brought to bear on the cause and not on the effect—upon the seat of the disease itself, and not upon the mere products of that disease.

The use of cupping.—To effect this quick and decided impression upon the fretted and irritable, and sero-mucous eliminating condition of the mucous membrane and subjacent tissues of the stomach and intestines, by the rapid and extensive abstraction of blood from the locality of the disease, cupping is the remedial measure worthy of confidence. Cupping has done its

duty well, and effectually in many cases: it has aided in a material degree the operation of medicines administered internally.

This mode of local depletion is preferable to the application of leeches. In applying leeches there is an unnecessary waste of time; there is also an unnecessary degree of worry caused to the patient. The drain of blood from the system may be sufficient, but leeches fail in producing that which is most required—a quick and decided impression on the irritable, the sero-mucous eliminating surface of the stomach and bowels.

With three cupping-glasses—one applied at the epigastrium, another to the right, and the third to the left of the umbilicus—from fifteen to twenty ounces of blood can be abstracted in less than ten minutes by an expert cupper. In eight or ten hours afterwards, if the impression made on the deranged condition of the stomach and intestines prove unsatisfactory, in not having diminished the quantity, and in not having arrested the frequency of these sero-mucous discharges, the cupping must be repeated, and an equal or a less quantity of blood abstracted. Under no circumstances should the cupping instrument give way to the lancet. In the earlier stages of cholera, whilst the pulse at the wrist is full and bounding and throbbing, the lancet may be used first—the cupping instrument soon after. The symptoms which contra-indicate the abstraction of blood by venesection do not contra-indicate the local abstraction of blood by cupping. In the last stage of cholera, when the patient is in the jaws of death, cupping has shared the fate of all other remedial measures: its failure, however, is no valid objection against farther trial, even in the last stage.

Thus much with regard to cupping. Whenever and wherever blood is attracted to an organ, to a membrane, or to any description of structure in the human body, by the fretted and irritable state of the invisible nervous filaments,—whenever, in consequence of this attraction, the capillary net-work of vessels becomes injected with blood, and gorged beyond the power

inherent in their coats to retain the fluid,—whenever lymph and serum, the saline ingredients or the red particles of the blood, percolate through the capillaries, and become extravasated, and the submucous glands secrete in excess,—in a word, whenever and wherever that morbid state prevails, known to pathological anatomists as local inflammation,—a practitioner will seldom err in covering the seat of inflammatory action with cupping-glasses.

Cupping externally, and the administration of lunar caustic internally, after the first discharge of rice-water or sero-mucous fluid from the stomach or from the bowels, have cut the attack of cholera short at once: it mattered not how virulent the type of the epidemic might have been at the time. Cupping externally, combined with lunar caustic internally, in regulated doses, has intercepted the progress of cholera in its march from the second to the third stage. In the last stage, the elimination of serum, mucus, and lymph from the internal surface of the stomach and intestinal canal have been checked by cupping externally, and lunar caustic internally; and, in consequence, life has been prolonged for hours beyond the time noted, in cases otherwise treated.

Within the reach of medical men there are not two such powerful remedial agents to arrest the secretions, on the one hand, and to subdue the inflammatory action, on the other, as the local abstraction of blood from the surface of the abdomen, by cupping externally, and the administration of lunar caustic internally in regulated doses. The value of these remedial agents has been proved in the acute, subacute, and chronic stages of dysentery and of diarrhœa, as well as in the acutest form of the Indian village cholera.

The use of lunar caustic.—That which baffles the physician's skill and medical treatment in cholera, is the fearful rapidity with which the powers of life sink. In the present state of medical science there is not a single medicine known through the instrumentality of which the relative proportions between the serum and the crassamentum of the blood can be immediately restored. Were such a medicine in the possession of the

faculty, the cholera difficulty, or the resuscitation of life in the collapsed stage, would be at an end: the problem would be solved.

In the absence of that miraculous agent, the preparation which can be employed with certainty in checking the extensive and excessive effusion, exudation, filtration, or percolation of lymph and of the serous particles of the blood from the circulatory system into the cavity of the stomach and intestinal tube, is the medicine to which attention should be directed.

From the unerring action exercised over the inflamed and otherwise morbidly deranged mucous membranes, lunar caustic is the therapeutic agent upon which reliance can be placed to arrest the progress of cholera in its earlier stages. Lunar caustic is the preparation which exercises an immediate, direct, and positive control over the serum-effusing, lymph-exuding, and mucus-secreting action which has arisen in the membranes and tissues and glandular bodies of the stomach and intestinal canal. Lunar caustic is the therapeutic agent which, when brought into immediate contact with the injected capillary net-work of vessels,—with the tumid and vascular and villous surface of the mucous membrane,—with the fretted, and irritable, and sero-mucous eliminating submucous tissues and glandular bodies,—arrests the secretions, cuts away the adherent layer of thick, glairy, gelatinous mucous, and effects an instantaneous change in the morbid action of the structures of the intestinal tube.

In whatever stage of cholera lunar caustic be administered internally, the effects produced on the irriteted, inflamed, and secreting tissues, by direct contact, are the same. So long as the tissues are endued with vitality, the changes produced by the direct application of lunar caustic to the irritated and inflamed mucous surface are invariable and unvarying. In this, then, consists the matchless value of lunar caustic—that it never fails in its action,—that in its active operations it is the safest and speediest remedial agent in controlling and effecting a change in the morbid condition of every structure, of every tissue, and of every secreting glandular body with

which it comes in contact during its passage from the stomach to the rectum.

Beyond this the valne of lunar caustic does not extend. Lunar caustic will not re-invigorate a system in which life is almost extinct. Nor will lunar caustic infuse fresh blood into the arteries and veins and capillaries through which have oozed out into the stomach and intestines all the ingredients, save the red particles of the patient's blood. Nor will lunar caustic disperse in the parenchymatous tissues of the lungs, the liver, or the brain, the stagnation of the devitalized blood feebly propelled by the heart's contractions.

Search the Pharmacopœia: there is not a preparation which will bear comparison with lunar caustic when the object to be gained is to arrest the morbid secretions from a mucous surface. In this, then, the control exercised by it is direct and positive.

When cholera, in its severest form, had broken out in the jail at Lullutpoor, the following instructions were drawn up for the guidance of the native doctors attached to the regimental hospital. In the hope that the adoption of the practice may be attended with benefit to those seized with cholera, I now proceed to transcribe them for general information :—

1. Pots of water must be kept boiling day and night; so that, when required, no unnecessary delay take place.

2. As soon as the patient arrives at the hospital, the "naund" (large earthen pot) must be filled with water as hot as can be borne, to which common salt and spirits of turpentine have been added. The feet, legs, and thighs of the patient should then be stuped; afterwards they must be wrapped up in his blanket.

3. Whilst the patient is undergoing this process of stuping or fomentation, you should ascertain from the patient himself, or from one of the persons by whom he has been attended, whether he has had one, or two, or more discharges, of rice-water fluid from the stomach and bowels. Should it appear certain, from their accounts, that he has not had more than two rice-water discharges from the bowels, or from the stomach, you will then place caustic pill No. 1. on the patient's tongue,

and allow him to drink as much cold water as he likes. But, should he have been purged or vomited any number of times more than twice, then place caustic pill No. 2. on his tongue, and allow him to drink cold water as much as he calls for. If the pills should not be retained on the stomach at first, they must be repeated.

4. When the patient has been in hospital from one to two hours after admission, get ready the cupping-glasses and the cupping instrument; stupe the abdomen well with flannels wrung out of hot water, salt, and spirits of turpentine. Use friction, so as to bring blood to the surface, if there be any in the patient's body; then cover the abdomen with glasses wherever they can get a grip upon the skin. Cup quickly, and take away as much blood as you can get. If you do not succeed in drawing blood, change the glasses four or five times: this will answer all the purposes of dry cupping. When blood does not flow, so much the worse for the patient.

In every case you must cup, whether the patient has had one vomit or twenty vomits,—one purge or twenty purges of rice-water fluid; and in every case cold water must be supplied in abundance, to carry the caustic pills downwards, and dilute them in their passage through the intestinal tube. Externally, heat should be applied, so that, if possible, a warm perspiration may break out over the body.

These are the steps to be taken by you at once, and without waiting for my arrival at the hospital. The loss of time in the treatment of cholera, when the patient arrives at the hospital, is invariably attended with loss of life. The saving of time affords to the cholera patient the best chance of the saving of life.

5. In four or five hours after the cupping, prepare a blister to apply to the abdomen. The cuts in the skin will require to be covered with thin paper or muslin. Should the blister vesicate, you are to dress the raw surface with blue ointment and simple ointment mixed together. When blood does not flow under the cupping-glass, the blister seldom rises. So much the worse for the patient. The chances are against

his recovery. This is in general the case when the pulse cannot he felt at the wrist. A supply of the following medicines must he kept in readiness at the hospital:—

Caustic pills, No. 1, consisting of lunar caustic, ten grains; water, six drops; atta, or flour, as much as will make a mass. To be divided into ten pills. Mark,—one grain in each.

Caustic pills, No. 2, consisting of lunar caustic, ten grains; water, six drops; atta, or flour, as much as will make a mass. To he divided into two pills. Mark,—five grains in each.

Caustic pills, No. 3, consisting of lunar caustic, ten grains; water, six drops,—dissolve; opium in powder, ten grains; emeticised antimonial powder, forty grains; mix together; divide into ten pills. Mark,—dysentery and diarrhœa caustic pills.

Emeticised antimonial powder, consisting of antimonial powder, one hundred grains; tartar emetic, five grains; ruh together for half an hour. Mark,—dose from five to ten grains.

This plan of treatment has been attended with a degree of comparative success. In the first and second stages of cholera I have trusted to these measures alone. With the results I have not heen disappointed.

In the third stage of cholera, I do not hesitate to confess that neither cupping, nor caustic, nor emeticised antimonial powder, nor calomel, nor any other description of medicine, have rescued many victims from the grave. In the stage of collapse, in which the powers of life sank with unaccountable rapidity, a few lives have been saved.

Their recovery has taken place when the pulse was gone, and the heart heat feehly,—when the voice was hollow and inarticulate,—when the eye was sunk,—when the extremities were icy cold, and the muscles were spasmodically contracted into rounnd hard halls,—when there remained no longer any strength to swallow medicine,—at such a moment, and when least expected, a profuse warm perspiration has hroken out over the body; the sheets and bedding have heen saturated with sweat. New life appeared to have been infused into the very blood of the corpse-like patient; his system has rallied; his vital energies have heen rekindled; the secretions from the mucous

ministered to each with care. As professional business rendered it necessary for me to visit a patient on shore, I gave strict orders to a trustworthy native to see that the coolies swallowed their medicine in his presence.

On my return to the ship, one of the coolies was reported to have died. The second I found lying in the same part of the between-decks fast asleep, close to the corpse of his fellow-villager. Although asleep, a heavy steam rose from his body. His rug felt as wet as if a bucket of water had been thrown over it. When he awoke he appeared exhausted. His pulse had returned at the wrist; the vomiting had ceased; the purging was checked; the tongue was warm, white, and loaded. With the aid of some mild purgatives he recovered, and was landed at Mauritius in sound health with the other Indian labourers.

Under more favourable circumstances the results of the treatment recommended have been more satisfactory. The subjoined cases are proofs to that effect.

CASE XI.—*Cupping externally—Lunar caustic internally—Recovery.*

Gundrup Sing, a political offender, confined as a prisoner in the jail at Lullutpoor, was removed to the hospital on the 7th October, 1849, at five o'clock P. M. His disease was cholera in its second stage. He had had several discharges of conjee-panee, or rice-water fluid, from the bowels, and had vomited the same kind of fluid from the stomach. His pulse was perceptible at the wrist, and ranged between 125 and 130 in the minute; its strength was indifferent; a sharp vibratory thrill was communicated to the touch. His body was warm, but the feet and hands were cold. The secretion of urine was suppressed; thirst was urgent; the muscles of the legs and thighs suffered from spasmodic twinges.

He was cupped over the abdomen in three places immediately after admission; from ten to twelve ounces of blood were taken away: the blood flowed sluggishly into the cups. Lunar caustic was administered internally. The vomiting and purg-

ing were instantly checked. The caustic was not rejected. Bottles filled with hot water were applied to the feet, and other parts of the body. At nine o'clock P. M. ten grains of emeticised antimonial powder were placed on his tongue, and washed down with cold water.

Between 11 and 12 o'clock, P. M., when I rode to the jail to see Dowriow Sing (Case No. X.), who had been brought in labouring under cholera in its third stage, Gundrup Sing was sweating at every pore. The pulse had fallen from 125 to 87, and had improved in strength and in softness. The blood in the system circulated more freely and more equally; the thirst had in a great measure subsided; and the spasmodic cramps in the muscles had ceased.

In three days afterwards he was discharged from the hospital convalescent.

Case XII.—Whilst I was directing doses of brandy, æther, camphor, and laudanum, to be given to Sona, (Case No. VIII.) to resuscitate the powers of life, *Jujoo, a female prisoner* in the jail at Lullutpoor, was seized with looseness of the bowels, quickly followed by violent vomiting of a thin turbid fluid, resembling a solution of gum, or rice water. In the morning she had been troubled with an uneasy rumbling of the bowels, with pains in the back and loins; with languor, and depression of spirits, and constant inclination to evacuate the bowels. Her pulse was quick, but full, 100 in the minute.

Her's was an attack of cholera, merging from the first into the second stage. She was desired to drink half a pint of cold water. A pill, containing one grain of lunar caustic, and five grains of emeticised antimonial powder, was placed on her tongue, and washed down with another half pint of water.

In two hours afterwards, a profuse warm perspiration broke out over her body. The vomiting was checked. The looseness of the bowels was stopped. The thirst was relieved. The pulse fell to 80 from 100. After the administration of some mild aperient medicine in the course of the following day, to relieve the bowels, she was returned convalescent. Her recovery was satisfactory.

Case XIII.—Doolun Khaugar, a prisoner in the jail at Lullutpoor, was admitted into hospital at 5 o'clock P. M., 23d November, 1849, with the symptoms of cholera. He had had five copious rice-water discharges from the bowels, and six rice-water discharges from the stomach. The secretion of urine was suppressed. His extremities were icy-cold, and slightly affected with spasms. The pulpy extremities of the fingers and toes were shrivelled. The breath was cold. The eyes were sunk in their sockets. The pulse, however, vibrated at the wrist. Its beats were sharp and contracted, ranging between 125 and 130. The impulse of the heart could not be felt. The action was weak and rapid.

Four cupping-glasses were applied to the surface of the abdomen, after the fomentations with hot water and spirits of turpentine. The patient was then allowed to drink water. A pill, No. 2, containing five grains of lunar caustic, was placed on his tongue, and washed down with half a pint of cold water. So great was the irritability of the stomach, that the pill was vomited twice. It was placed a third time on the tongue, and washed down with an ounce of water. He was not allowed to take any fluid for half an hour.

In less than half an hour after swallowing the caustic pill, a copious discharge of rice-water fluid, mixed with flakes of lymph and shreds of mucus, was voided from the bowels. In another half hour, another discharge, equal in quantity, was also voided: but this was the last. The pill was not vomited a third time. At the expiration of the half hour he was allowed to drink as much cold water as he wished. He felt his inside getting comfortably warm. At 8 o'clock, in consequence of the vomiting having ceased, five grains of emeticised antimonial powder were given.

At 10 o'clock P. M. I rode over to the jail. The patient had recovered his speech. The skin was warm and perspiring. The extremities were warm. The pulse had fallen to 90 from 125, and had expanded in volume. The thirst had diminished. The breath had become warm. The cuts in the skin were covered, and a blister was applied to the abdomen.

The blister vesicated, and was dressed with blue ointment and simple ointment, mixed. After the third dressing the gums became spongy, and the breath fetid. On the 24th, urine was voided in small quantities, and in a turbid stream.

The subsequent treatment consisted of mild purgatives, with five-grain doses of emeticised antimonial powder and calomel, at night. After the solution of the caustic pill in the stomach, and in its passage through the intestinal canal, he had not a single vomit, nor a single purge of rice-water fluid. The first evacuation from the bowels was brought away by a mild purgative draught, and was greyish-white in colour. The recovery proved to be satisfactory.

Case XIV.—Dherah, a prisoner in the jail at Lullutpoor, was removed to hospital, suffering from cholera in the second stage. He had had from eight to ten copious rice-water discharges from the bowels, and four vomitings from the stomach. His pulse was feeble and thready, but could be felt at the wrist. The muscles in the calves of the legs and in the arms were spasmodically contracted into hard round balls. The extremities were cold. The eyes, somewhat sunken, were bright and clear. The tongue was warm. Thirst was insatiable. The more water he drank, the more he desired to drink. The abdomen was sunken and doughy, inelastic under pressure.

The abdomen was covered with cupping glasses, after the feet and legs had been fomented with hot water and turpentine. The blood flowed sluggishly. From 8 to 10 ounces were abstracted. Pill No. 3, containing one grain of lunar caustic, one grain of opium, and five grains of emeticised antimonial powder, was placed on his tongue, and washed down with cold water. The pill was retained on the stomach. In four hours afterwards a second pill was given. This also was retained. He was allowed to drink cold water in large quantity.

After the first pill he had one copious discharge of rice-water fluid from the bowels, containing a thick sediment. It filled a large earthen pot. The pulse at the wrist sank. The beats could not be felt. After the second pill the purging ceased. He had not a single vomit, nor a single purge of rice-water, or

sero-mucous fluid, until a mild purgative draught was administered to clear out the howels. The secretion of urine, suppressed in the first instance, was restored in the course of 24 hours. The pulse returned at the wrist, and although ranging above 100 beats in the minute, was fuller, and softer in volume, than when admitted.

In the evening of the 7th a large blister was applied to the abdomen, and vesicated. The raw surface was dressed with blue ointment. After the fourth removal of the dressing, salivation unequivocally declared itself. The subsequent treatment consisted in supporting his strength with sago, and in regulating the howels with mild mercurial purgatives. He recovered.

Case XVI.—Bhowany-deen, cooley, was seized with choléra. The first rice-water discharge from the stomach occurred at 10 o'clock A. M. This was succeeded by a constant running from the bowels, of rice-water fluid. Before 12 o'clock the muscles in the calves of the legs suffered from violent cramps. The powers of life were sinking rapidly. The extremities had become cold and shrivelled. Thirst was insatiable.

In this almost hopeless state, caustic pill No. 2, containing five grains of lunar caustic, was placed on his tongue, and washed down with cold water. It was retained on the stomach. The cupping-glasses were applied to the surface of the abdomen. A few ounces of blood oozed out from the cuts in the skin. At 2 o'clock P. M., 10 grains of emeticised antimonial powder were given, and retained on the stomach. In the evening a blister was applied to the abdomen.

From the time that he swallowed the caustic pill in the morning, until 10 o'clock at night, he had but one rice-water discharge from the bowels. The stomach, however, remained perfectly quiet, and did not reject the antimonial powder. In the afternoon reaction set in. The skin became warm, the pulse expanded at the wrist: the circulation was carried on more freely and more equably. The extreme urgency of thirst subsided. The muscular cramps in the calves of the legs were relieved.

The subsequent treatment consisted of five grains of emeticised antimonial powder, and five grains of calomel, morning and evening. His strength was supported by sago. The functions of the kidneys were restored, and the evacuations from the bowels were tinged with bile, as the greyish white colour of the stools disappeared. His recovery was satisfactory.

These are a few of the cases selected from the list of recoveries. That the action of lunar caustic on the mucous surface of the stomach and intestinal canal tends to prolong life, when cholera has advanced to the third stage, is exemplified in the subjoined cases.

Cupping externally, and lunar caustic internally—Life prolonged in the third stage of cholera.

Case XVI.—Fifteen hours after death the stomach and intestinal canal of Dhoonkhul Kautchee were slit open. He was a prisoner in the jail at Lullutpoor, and was seized with cholera on the 16th of October, 1849.

The mucous membrane of the stomach was pale, and healthy in appearance. It was devoid of vascularity. There was not the trace of a blood-vessel visible. The surface was free from the coating of thick, tenacious, glairy mucus. On the posterior wall, about midway between the termination of the œsophagus and the pylorus, a dark circular caustic stain existed. In circumference it equalled that of a silver fourpenny piece. The discolouration had penetrated through the superficial layer of mucous membrane, to the submucous tissue, but no deeper. Close to the pylorus, and situated on the posterior wall of the stomach, two other caustic stains were brought to view. Of these, one was superficial, and engaged little more than the epithelium: the second stain was deeper, more circumscribed, and penetrated as far as the submucous tissue, through the superficial mucous coat.

On the posterior wall of the duodenum, the colour of the mucous membrane was dark brown. In the duodenal pouch, or first division of the gut, where deep-seated redness generally

exists, all traces of vascularity had disappeared. Throughout the three divisions of the duodenum there were ocular proofs of the passage of the caustic. The stains were superficial, and did not extend even to the submucous tissues. Long white streaks, and circular spots of a dusky whiteness, dotted the surface of the mucous membrane, and denoted the contact of the caustic with the epithelium of the mucous membrane.

In the jejunum and ileum intestines, the course of the lunar caustic pill was traced with accuracy, and with certainty as far as the lower part of the ileum. Within five inches of the cæcum caput coli, the last of the caustic appeared to have come in contact with the mucous membrane. Beyond this point there was no ocular proof of direct contact. The spots and circular dots, and long narrow streaks of dusky whiteness, were slightly raised above the surrounding smooth and glistening mucous surface, and contrasted strongly with the vascularity and crimson red tint of the submucous tissues, beyond the influence of the caustic.

In addition to the dusky-whiteness, the mucous membrane corresponding to the track of each caustic streak appeared puckered; the mucous surface was freed from the gelatinous, glairy mucus, adherent to the epithelium, untouched by the caustic, and all vascularity in the immediate vicinity of the caustic streak had dispersed.

Although the stomach and duodenum were empty, yet the jejunum and ileum intestines were distended with fluid secretions of serum, mucus, lymph, and other ingredients, which from their intimate blending together, resembled thin water gruel. In the lower division of the ileum, as far as its termination in the cæcum, the secretion which adhered tenaciously to the surface of the mucous membrane resembled the thick sputa expectorated in bronchitis. This exudation had collected in large pellets in different parts of the intestine. The fluid contained in the colon and rectum corresponded in appearance and in the flaky deposits, or sediment, with that evacuated during life from the bowels.

The mucous membrane in the jejunum for the most part re-

tained the faded rose-coloured tint. Whilst the mucous membrane of the ileum was more vascular, the depth of crimson redness extended to the submucous tissues; the capillaries were more prominent from excessive engorgement; and the glandular bodies were more tumid and more deeply injected. In the large intestine a few patches of vascularity were apparent. The mucous membrane in other respects was healthy.

The liver was healthy, excepting at the sharp edge of the inferior lobe. The structures here were gorged with fluid tar-like blood. The gall-bladder was distended with thick, black, treacle-like bile. The kidneys were healthy. The bladder was contracted and empty. It did not contain a single drop of urine. There was chronic enlargement of the spleen.

The left ventricle of the heart contained a quantity of fluid tar-like blood. That in the right ventricle was trifling. The muscular structures of the ventricles were healthy. The lower lobes of the lungs were engorged. The mucous membrane of the bronchial tubes was intensely vascular.

Symptoms on admission.—Cold extremities; cramps in the muscles of the legs, thighs, and abdomen; vomiting and purging of rice-water fluid frequent. His eyes were sunk in the sockets, but were clear and bright. His intellect was clear. The pulse could not be felt at the wrist. The heart's impulse was imperceptible. The action was feeble. The sounds were indistinct, and resembled the distant ticking of a watch. The action of the large arteries, indicated by the clear, sharp click, or second sound, was more distinctly heard towards the fourchette of the sternum, than below the nipple of the left breast. Thirst was insatiable. The greater the quantity of water he drank, the more he wanted. Restlessness, and constant jactitation of the limbs, were marked features in his case. The abdomen was sunken and doughy, inelastic under pressure. Secretion of urine was suppressed. The bladder had been emptied with, or soon after, the first gush of rice-water fluid from the bowels, but since then no urine had been passed by him.

The sinking of the energies of life in this prisoner was rapid

and sudden. An hour previous to admission he required no assistance to walk to a distance and discharge the liquid contents of the bowels. His symptoms on admission into hospital left no hope for recovery. His death was hourly looked for.

His feet and thighs were fomented. The cramps were relieved. Friction and stuping of the abdomen were employed previous to cupping. A few clots of dark blood oozed out under the glasses; afterwards, a blister was applied, but did not vesicate. Whilst the fomentation of the extremities was carried into effect, a pill containing five grains of lunar caustic was placed on his tongue, and was washed down with cold water. Shortly afterwards he rose from the charpoy (bedstead), and filled an earthen pot with aero-mucous fluid, containing a thick flaky sediment. The quantity passed must have exceeded two quarts.

This was the last discharge from the bowels. With this exception, from the time he swallowed the five grains of caustic until he died, he was neither vomited nor purged. At 12 o'clock P. M., five hours after admission, symptoms of reaction set in. A degree of comparative improvement was obvious. The temperature of the body had improved. The icy-coldness of the extremities had passed away. The spasmodic contractions of the muscles were not so frequent nor so violent. The urgency of thirst was somewhat abated, and the vibrations of the artery at the wrist were communicated to the finger.

The hope now entertained, that the worst had passed, proved to be fallacious. Between 3 and 4 o'clock P. M. he relapsed into a state of icy-coldness; a clammy sweat broke out over his face, neck, and chest; his breathing became difficult. He died in the evening, about 10 hours after admission into hospital.

The arrest of the secretions from the inflamed mucous surface of the stomach and intestinal canal, by the direct action of the lunar caustic, prolonged life in this instance. The examination of the viscera afforded ocular proofs that, in its action, lunar caustic is invariable and unvarying, whether it be administered in the first or in the last stage of cholera.

CASE XVII.—*Cupping externally; lunar caustic internally—Life prolonged in the third stage of cholera.*

Fourteen hours after death the stomach and intestinal canal of Maruw Joo were examined. He was a prisoner in the jail at *Lallatpoor*, and had fallen a victim to cholera on the 14th October, 1849.

The internal surface of the stomach was coated over with a layer of glairy, gelatinous mucus, mixed with flakes of plastic lymph. In several places this extraneous exudation appeared to have been completely detached from the mucous surface, whilst here and there a few separate patches adhered to the epithelium of the mucous membrane by shreds of mucous. Over the greater part of the internal surfaces the glairy jelly-like secretion of mucus adhered tenaciously to the mucous membrane. When removed by scraping, or detached by a forcible jet of water, the epithelium underneath appeared flossy and deeply injected, participating in the scarlet and deep crimson redness of the mucous membrane. The mucous membrane also, was glossy, and polished, and tumid. The intumescence arose from the infiltration of serous fluid into the submucous cellular tissue.

Within two and a half or three inches of the adherent coating of mucus, where the exudation was more dense than elsewhere, several broad, dark, but superficial caustic stains existed. In the immediate vicinity of these stains, the epithelium and mucous membrane were freed from the coating of gelatinous mucus, and from vascularity. At the pyloric orifice, one caustic stain, and a streak of dusky whiteness, were noticed. Within a short distance of each the mucous membrane appeared slightly puckered, but was free from mucus and from the deep vermilion injection, rendered apparent by the detachment of the exuded mucus on the posterior wall.

In the first division of the duodenum, or sacculated pouch of the gut, there remained indistinct traces of inflammatory action. Here, as well as in the stomach, superficial stains, dots, and narrow streaks of dusky whiteness, tracked the course of the

lunar caustic pill. In the second and third divisions the mucous membrane presented a faded rose-coloured tint, but no trace of the pill. The gut was distended with a thick, creamy, greyish-coloured fluid; and between the folds of the mucous membrane, flakes of lymph, and pellets of inspissated mucus, adhered to the surface.

Jejunum and ileum.—In the former the fluid contents were thick and gruel-like. As in the second and third divisions of the duodenum, this cholera-puddle was formed by the intimate blending together of serum, mucus, lymph, and the saline ingredients of the blood. The intestine was loaded with these exudations or abnormal secretions. From each section of the gut, ounce after ounce trickled away. Unless witnessed, it could scarcely be credited that so large a quantity of sero-mucous fluid mixed with lymph, remained in the intestinal canal after the copious discharges from the bowels during life. In the ileum, however, the cholera-puddle did not exist in any quantity. The secretion with which the mucous surface was besmeared was viscid, tenacious, concrete.

The faded rose-coloured tint, noticed in the duodenum, pervaded the entire length of the jejunum. The mucous membrane was tumid, and glossy from the infiltration of serous fluid into the submucous cellular tissue. The epithelium was flossy, and participated in the rosaceous tint of the mucous membrane. The capillaries were injected with crimson-red blood. The engorgement of the mucous membrane was more marked in the ileum than in any other portion of the intestinal tube. Within a few inches of the cæcum caput coli, the discolouration was dark red, approaching to purple. On the mucous surface of these intestines there were no ocular proofs of the caustic having come into contact with the mucous membrane.

In the colon and rectum, the fluid contents emptied from the gut were precisely the same as the rice-water discharges evacuated during life. The mucous membrane in each intestine was pale, and besmeared with a thin coating of mucus, resembling a thin solution of gum.

About four inches from the cæcum caput coli, a black circular patch attracted notice. The undissolved portion of the caustic pill had become impacted in a fold of the mucous membrane of the colon, and during the process of solution had formed a large circle. The caustic penetrated to the submucous tissues at the immediate point of impaction. Beyond this, however, its action was limited to the surface. The passage of the pill through the jejunum and ileum intestines must have been quick.

The glandular bodies in the stomach and small intestines presented an irritated appearance. In many places they were prominent, distended with a semitransparent fluid, and formed points, towards which the capillaries injected with crimson-red blood, converged. The excretory ducts of the most prominent glandular bodies, also, appeared under the lens to participate in the irritated and inflamed condition of the gland. The mouths were wide and pouting.

The structures of the liver were healthy, except at the thin edge of the left lobe. In this part of the viscus some stagnation of dark fluid blood had taken place. The gall-bladder contained a quantity of dark treacle-like bile, which, when rubbed on paper, or between the fingers, left a dark bottle-green stain. The spleen, pancreas, and kidneys, were healthy. The bladder was contracted and empty. There was not a drop of urine inside.

The left lung was solid—in part hepatised, and in part engorged with fluid blood. The mucous membrane of the bronchial tubes was injected with dark venous blood. The right lung was partly engorged on its lower and posterior aspect. The left cavities of the heart were loaded with a black jelly-like blood. The right cavities were empty. The structures of the auricles and ventricles were sound.

Symptoms on admission.—Vomiting and purging of rice-water fluid had been frequent, and were quickly followed by cramps in the toes and calves of the legs. His extremities were cold, and the pulpy points of his fingers and toes were shrivelled. His breathing was laboured. Thirst was insatiable.

His constant call was for cold water. The tongue was cold at the tip and at the sides, but was moist and warm towards the back part. The pulse was indistinctly felt at the wrist: its vibrations were so rapid that they could not be counted. A weak and thready sensation was communicated to the finger. The action and sounds of the heart were indistinct from the rapidity with which one sound succeeded the other. In the left lung there existed the physical signs of solidity and engorgement of the tissues.

He was cupped, but no blood flowed from the surface of the abdomen. The cupping was followed by the application of a blister, but no vesication ensued. A pill, containing five grains of lunar caustic, was placed on his tongue and washed down with cold water. Cold water was supplied in abundance. He was allowed to drink as much as he desired. From the time that he swallowed the caustic pill until he died exhausted, he had not a single vomit nor a single purge. Whatever was swallowed in the shape of drink or of medicine was retained in the stomach.

In the course of two hours after the pill had been administered an improvement in the state of the patient took place. The symptoms of reaction set in. A greater degree of warmth was developed over the surface. A larger volume of blood circulated through the arteries. The pulsations at the wrist became more perceptible. The violent spasmodic contractions of the muscles were subdued. There was more life and energy in the patient. His calls for water! water! water! were not so frequently repeated.

The improvement was only temporary; it was not progressive. The symptoms of extreme collapse succeeded. A cold clammy sweat broke out over his neck and body. The pulse ceased to beat at the wrist. The action of the heart became convulsed. The sounds were scarcely audible. Death terminated his sufferings.

The features worthy of notice in the preceding cases are—1st. The cessation of the vomiting, and the allaying of the irritability of the stomach. 2d. The arrest of the rice-water

purging from the bowels. 3d. The relief afforded to the patients from the violence of the spasmodic contractions of the muscles. 4th. The temporary reaction in consequence of the arrest of the internal sero-mucous flooding, and the prolonging of life for hours beyond the time indicated by the symptoms.

The facts ascertained in the examination of the stomach and intestinal canal are important. The proofs visible to the eye, and traceable by the touch, set at rest the question as to the positive control exercised by lunar caustic over the irritated *and inflamed gastro-intestinal mucous surface.* This is the essential point established. Through it can be explained the irresistible agency of lunar caustic in arresting an attack of cholera at the onset, or in its first stage, and of checking the progress of the disease from the second or intermediate stage, to the third or the stage of collapse.

Lunar caustic, administered in quantities so small as one grain, repeated at intervals, does not yield any marked results in the third stage of cholera. When diluted in the thick greyish-coloured, gruel-like, cholera-puddle, consisting of the secretions of serum, mucus, lymph, and other ingredients blended together, its action on the mucous surface is interrupted.

Case XVIII.—Soon after admission into hospital, Heera, a prisoner in the jail at Lullutpoor, was violently purged. Three copious discharges of rice-water fluid gushed from his bowels. Had this sero-mucous secretion been measured, the quantity would have exceeded three quarts. At the same time, about a pint of clear serous fluid was ejected from the stomach. His pulse was depressed, and vibrated feebly under the finger. His lips, the mucous membrane of the mouth and of the gums, had changed colour to a deep indigo blue. The skin of the fingers and toes, and of their pulpy extremities in particular, was shrivelled. His extremities were cold. Spasmodic contractions rounded the calves of the legs into hard balls. The spasms extended to the muscles of the abdomen, and to those of other parts of the body. The abdomen was sunken and doughy; inelastic, but free from pain. The pulse counted in the large

arteries ranged between 135 and 140. The secretion of urine was suppressed. He suffered from an insatiable thirst. The more water he drank, the more he desired to have.

According to the instructions given, he was cupped over the abdomen after the fomentation of the extremities. A few clots of dark venous blood oozed out under the glasses. The blood abstracted might have filled a table-spoon. Instead of the pill containing five grains of caustic, one composed of one grain of lunar caustic, five grains of antimonial powder, and one grain of opium, was placed on his tongue and washed down. The results were so far satisfactory that the vomiting and purging were checked. The violence of the cramps was subdued, and the temperature of the body was improved. After these symptoms of reaction, stimulants and anodynes were administered. They were retained on the stomach, but exercised no influence over the progress of the symptoms to a fatal termination. He died on the 13th October, 1849.

Eight hours after death.—The gastro-intestinal canal was slit open. The stomach was distended with the water drunk during life. Its internal surface was coated over with a dense layer of semi-transparent gelatinous mucus, mixed with flakes of plastic lymph. This morbid exudation adhered tenaciously to the anterior and posterior walls of the stomach, but terminated by an abrupt line within two and a half or three inches of the pyloric orifice. When scraped off, or washed away by a strong jet of water, the mucous membrane and subjacent tissues presented shades of redness, from deep scarlet, to the faded rose-colonred or pinkish tint. The folds of mucous membrane on the posterior wall were deeply dyed.

Close to the pyloric orifice these shades of redness did not exist. Two circular dark patches, a few inches apart from each other, were noted. The stains had penetrated below the superficial lining membrane to the submucous cellular tissue. In proximity to, and for nearly three inches beyond these caustic marks, the mucous membrane was pale, and freed from the thick coating of glairy gelatinous mucus. The tumid, glossy, and vascular state of the tissues towards the œsophageal end

of the stomach contrasted strongly with the change which had taken place close to the pylorus, and in the vicinity of the caustic discolouration.

A small quantity of thick mucus was contained in the duodenum. The mucous membrane of this intestine exhibited a faded rose-coloured tint, except in the vicinity of a long black dotted line, and a streak of dusky whiteness, slightly puckered and raised, by which the contact of the caustic with the mucous surface was denoted.

The jejunum and ileum intestines contained a small quantity of thick, dark green fluid. The surface was besmeared with a secretion, in which lymph, mucus, and serum, were blended together. Flakes of inspissated mucus, and of plastic lymph, were lodged between the folds of the mucous membrane. The epithelium in the jejunum was flossy, and participated in the vascularity of the mucous membrane. The glandular bodies in each intestine appeared swollen, vascular, and distended with a semi-transparent fluid. Their excretory ducts gaped wide. For several inches above the cæcum esput coli the mucous membrane of the ileum was deeply injected; and for a short distance below this point the mucous membrane of the colon participated in the same dark red vascularity bordering on a purple discolouration of the tissues.

The large intestines were loaded with sero-mucous fluid, in which shreds of lymph and mucus floated. The secretion corresponded in every respect with the rice-water discharges evacuated from the bowels during life. Patches of vascularity dotted the membrane here and there. There was no trace of the caustic beyond the black line, and the streak of dusky whiteness, noticed on the mucous surface in the first and second divisions of the duodenum.

The liver, kidneys, and pancreas appeared to be free from disease. The gall-bladder was distended with dark viscid bile. The spleen was affected with chronic enlargement. The bladder was empty. The lungs retained their crepitating feel. A crimson redness was diffused over the surface. The mucous membrane of the bronchial tubes was dyed of a dark red co-

lour. The right and left cavities of the heart contained a small quantity of fluid, tar-like blood. The muscular fibres were sound.

Case XIX.—Under circumstances equally unfavourable, Newul, a prisoner in the jail at Lullutpoor, was carried to the hospital, suffering from the effects of cholera. He remained under treatment for 32 hours. In the course of treatment, three grains of lunar caustic were given in separate doses of one grain each, and at stated intervals of time.

In twelve hours after death the gastro-intestinal canal was slit open. With the exception of a few dark circular superficial stains, and a few patches of dusky whiteness, the internal surface of the stomach presented a sheet of vermilion redness, of greater depth of colour on the posterior wall, and at the pylorus, than towards the œsophageal end. The intensest degree of vascularity occupied a space two inches within the stomach, close to the pylorus, and three inches beyond the pyloric orifice, in the first division of the duodenum.

The injection of the capillaries with dark stagnated blood, corresponding to this space, imparted a purplish colour to the mucous membrane and subjacent tissues. The exudation of gelatinous mucus formed a coating over the surface, and the infiltration of serous fluid between the strata of tissues gave a glossy, tumefied, and velvety appearance to the mucous membrane. This contrasted strongly with the dusky white and slightly puckered surface of the mucous membrane close to the caustic stains.

In the second and third divisions of the duodenum, the intumescence of the mucous membrane was strongly marked. The glandular bodies were swollen, and formed central points of vascularity, towards which the minute branches of injected blood-vessels converged. A faded rose-coloured tint ran through the mucous membrane in this intestine, as well as in the jejunum. A thick gruel-like secretion of serum, mucus, and lymph, intimately blended together, filled the gut.

The internal surface of the jejunum was coated over with a layer of gelatinous mucus. In several places the contact of the

caustic was denoted by black dotted lines, and by stripes of dusky whiteness. In the localities where these marks were present, the inflammatory redness had disappeared; the injected condition of the capillaries was absent, and the distension of the glandular bodies was scarcely observable under the puckered and wrinkled surface of the mucous membrane. In the ileum there were no traces of the caustic. The surface of this gut was covered with inspissated gluey mucus, detached with difficulty from the mucous membrane. The epithelium was flossy. The subjacent tissues of the intestine were dyed of a deeper red than in the upper part of the tube. In the colon and rectum there were extensive patches of vascularity. The ilio-cæcal valves participated in the crimson redness of the lower division of the small intestine.

The liver was free from engorgement, and in appearance was healthy. The gall-bladder was distended with tar-like bile. There was some enlargement of the spleen, of chronic duration. The kidneys were healthy. The bladder was empty. The inferior lobes of the lungs were gorged with fluid black blood, and had lost their crepitating feel. The superior lobes were in a more healthy state. The cavities of the heart were distended with blood, uncoagulated, black, and tar-like. The large venous trunks in the abdomen and thorax in like manner were distended with fluid blood.

Lunar caustic, and the other remedial measures adopted, failed in saving life. Had those patients survived, lunar caustic might deservedly rank as a preparation the most valuable yet tried in the treatment of cholera. Cupping failed, in consequence of the blood having retroceded from the surface, and in consequence of its tendency to stagnate and become extravasated in the parenchymatous tissues of the internal viscera. Confidence, however, ought not to be shaken in the virtues of the one, nor in the value of the other, inasmuch as the results would have been otherwise had the patients been seen at an earlier period of the cholera.

The use of calomel and opium.—Of all medicines that have been prescribed in the treatment of cholera, calomel has had

the longest, the most extensive, and the fairest trial. Next to calomel, opium takes its place.

In the earliest development of the symptoms in cholera, calomel has heen prescribed with an unsparing hand, hy itself or combined with opium. Thus each medicine has heen subjected to the fairest test, to ascertain its value as a remedial agent in this particular form of disease. The tide of public opinion has set in against the use of calomel in cholera. It would he unjust to say that calomel and opium, administered separately or combined, have not heen instrumental in saving life in instances without number. There is scarcely a member of the profession who will not readily bear testimony to their having done so within the range of his practice.

Confidence in the much-landed value of calomel and opium, as well as in the specific virtues of every other description of medicine, has been shaken, in consequence of the rates of mortality being disproportionably great, compared with the number of cases under treatment resulting in recovery. So long as the rates of mortality from the effects of cholera average between 40, 50, and as high even as 60 per cent., we cannot expect that confidence on the part of the public, or confidence on the part of men in the profession possessed of common sense, should be reposed in medicines from which such results ensue. That plan of treatment must command confidence to the exclusion of every other by which a reduction can be effected in the rates of mortality from 60 to 30, from 50 to 25, and from 40 to 20 per cent.

Calomel has failed in the first of the essential virtues of a specific. Calomel and opium have failed in invariably subduing cholera at the onset, and in arresting its progress, when administered in the second stage. Could quantity have added to its value, I have prescribed scruple after scruple of calomel hy itself, or combined with one and two grain doses of opium. I have seen one and both prescribed hy others, in more heroic doses than I have ventured to give, until the patients had swallowed as much calomel as would have salivated, under ordinary circumstances, a troop of dragoons; and as much

opium, in powder and tincture, as would have stupified a company of infantry; yet the patients neither slept, nor did they ever exhibit the slightest approach to salivation.

The reason is obvious. In the type of disease to which alone the term "cholera" should be applied, the internal surface of the stomach is coated over with a layer of tenacious, glutinous, or gelatinous mucus, blended with lymph, semitransparent, and of the consistence of a thick solution of isinglass; and, at the same time, the functions of the absorbents are suspended. Therefore, these medicines will not act, and cannot act. So *long as the duodenum, jejunum, and ileum intestines, are distended* with secretions of serum, of mucus, lymph, and the saline ingredients of the blood, blended together, and forming the characteristic cholera puddle,—so long as the surface of the small intestines is besmeared with a ropy, inspissated, and glutinous mucous exudation, and the action of the absorbents remains suspended, medicines will not act and cannot act.

On this account calomel will not salivate, nor will opium stupify. With each gush of sero-mucous fluid from the bowels, the medicines are discharged from the body as they entered, without having undergone any material change in their properties. On this account, also, one grain of lunar caustic brought into contact with the coats of the gastro-intestinal canal will exercise a more immediate and direct control over the morbid state of the mucus membrane, glandular bodies, and subjacent tissues, than calomel or opium, or any other description of medicine, however large the dose may be.

In administering calomel, if the object be to reduce inflammatory action through the medium of salivation, that end can be gained more easily and more speedily by the free use of mercurial frictions. In cases of recovery from cholera, in its second stage, where blood has been abstracted by cupping, and where blisters have vesicated, the second or third dressing of the raw surface with mercurial ointment has produced fetor of the breath, sponginess of the gums, and a flow of saliva from the glands. The action of mercury, introduced into the system from without, by friction, or by the application of mer-

curial ointment to a raw absorbing surface, has aided in protecting the patient against the serious consequences of consecutive fever, and has also contributed to the termination of the case in a favourable manner.

Case XX.—Ramdeen, a cooly, was seen in the second stage of the Indian village cholera. The symptoms were verging on the third stage. He was cupped extensively over the abdomen. The blood flowed at first sluggishly. After the second removal of the glasses the blood flowed more freely, and was changed in colour. A pill, containing five grains of lunar caustic, was placed on his tongue, and was washed down with copious draughts of cold water. In six hours after the cupping a blister was applied to the abdomen. Vesications formed. The vomiting was instantly checked. The purging was reduced to one gush of sero-mucous fluid from the bowels from the time that the caustic pill was swallowed. The pulse expanded in volume; thirst was allayed; heat returned to the extremities; the spasmodic twitches in the muscles of the legs and forearm, and in the course of the diaphragm, were removed. The progress of the disease was effectually checked.

The raw surface of the abdomen was dressed with mercurial ointment after the removal of the blister. At the third dressing the breath was fetid: the odour exhaled was mercurial: the gums were spongy. After the fourth dressing, profuse salivation set in. After the action of the mercury had developed itself, there did not arise a single untoward symptom to retard his recovery.

The recovery in this, as in all similar cases of cholera, must be attributed to the administration of the lunar caustic before the disease had passed into the third stage. Under similar circumstances, the same results have ensued from the extensive abstraction of blood externally by cupping, and from the use of lunar caustic internally.

The principle of treatment set forth in these notes is twofold. I do not claim for this plan of treatment that which I conceive to be a gross absurdity,—the merit of effecting a cure in every case, and under all circumstances. The antidotes for cholera

are innumerable: their name is legion. Were we to judge of their infallible virtues by the registered rates of mortality, we must own that the per-centage of deaths to recoveries is unsatisfactory in the extreme. The list of anti-cholera specifics is so long, and so closely packed, that it need not be added to. Year by year the antidote list has been increased by an autumnal crop of cholera specific-mongers, until it has extended to such a length that the eye wearies, and the intellect flags, in endeavouring to select from so great a variety that miraculous agent which will rescue the victim of cholera from the grave, and re-animate his lifeless system.

A member of the medical profession, who had emigrated from Aberdeen to London, assured me not many years ago that he had hit upon an antidote for cholera. That form of disease called English cholera was raging at the time, but was confined to the localities of the poor. In the narration of the miraculous cures effected by his antidote, his eyes brightened,—a glow of triumph flushed his face. He had pictured to his mind's eye success in gaining by rapid strides eminence in his profession, and with it of securing an extensive and lucrative practice in London.

His were the visionary dreams of an enthusiast. He had combined opium with some other drugs, and had treated with success a few cases the symptoms of which resembled cholera. Elated with the results, and flattered by the congratulations of his grateful patients and their friends, his judgment became warped. In an evil moment he drew up a detailed account of his cases, skilfully and successfully treated, and committed the valuable document to the fostering care of the junior editor of a daily paper,—a fellow-emigrant from Aberdeen. The communication was ushered into the world, in company with an eulogistic editorial leader. The epidemic assumed a more formidable type, and with it the number of his patients increased. I hastily concluded he was travelling at a railroad pace on the high road to fame and fortune in the great metropolis, as I was informed he could not call an hour his own.

A few weeks before I quitted London for British Guiana I

met my friend by appointment. He appeared downcast: care and anxiety had shaken his self-confidence. Something had gone wrong, either with his antidote, or with the type of the disease, since he had started into such extensive practice. He was unreserved in his manner, and communicated to me that he was fagged off his legs with professional business; hut that latterly he had lost, in the most unaccountable manner, several patients, amongst whom was his staunch friend and patron, the junior editor, and another, an attorney, npon whose recovery depended his introduction into a circle of respectahle fceing patients.

This was not all. Had his misfortunes stopped here, his skill and judgment as a practitioner might not have heen tested by his success in practice. It is more than prohable the value of his antidote in ridding the world of a newspaper editor and of an attorney would have heen tested hy the opinion of the uncharitahle. Such is the force of prejudice against these two classes of the community, that a person unfcelingly remarked at the time, the doctor and his cholcra antidote deserved to be canonised as sterling henefactors of mankind.

A greater misfortune was in store. In his visits to patients, the emigrant surgeon from Aberdeen had encroached npon the purchased rights of a London general practitioner, who had an inveterate dislike to Scotch interlopers. The envy of this apothecary, chemist, and druggist,—all three combined in one,—had been roused by the newspaper success of the cholera antidote. Pills prescribed hy the score, and dranghts hy the dozcn, within the heat of his purchased rights, in his opinion was the perfection of practice in medicine. For such privileges, secured hy parchment documents, he had invested his money.

The unfortunate mishap which had hefallen my friend's cholera antidote did not lie huried in the graves of the newspaper editor and of the attorney, solicitor, and proctor: it was stereotyped in a living newspaper. Through the pnblicity given hy this splenetic apothecary, his Scotch rival and the cholera antidote were driven out of the neighhourhood. To such a length was the persecution carried, that the latter

accepted an offer to proceed to the United States of America, and quitted London in disgust.

Thus much, however, may be recorded in favour of the treatment recommended. Of one hundred cases of the Indian village cholera, admitted into hospital in the first, second, and third stages,—if an equal division of the cases in each stage be made, and one-half be treated on the principle of abstracting blood locally by cupping, and of arresting the secretions of serum, mucus, and lymph, by the administration of lunar caustic internally, the mortality will be numerically less than in the second half, treated on any other plan with which I am acquainted.

Emeticised antimonial powder,* prescribed in doses of from five to ten grains, after the lunar caustic has made an impression on the morbid inflammatory action in the stomach and intestinal canal, will in general effect a diversion of the sero-mucous secretions from the gastro-intestinal mucous membrane to the skin. The functions of the kidneys have also been restored. The first discharge of urine from the bladder has flowed in a turbid stream, and has been loaded with a thick sediment. In the subsequent treatment, strict attention must be paid to supplying the patient with light nutritious food, and in regulating the bowels by mild purgatives. By degrees the inspissated and tenaciously-adherent mucus becomes detached from the surface of the mucous membrane, and forms the bulk of the dejections passed from the bowels. The stools are ashen-grey in colour: at a later period they become tinged with bile.

The General Board of Health in London have favoured the public and the profession with important notifications relative to the measures to be adopted in the premonitory stage of cholera. The following paragraphs have been extracted from one of these notifications:—

"Cholera!—Medical authorities are agreed, that the remedies

---

* *Vide* MED. GAZ.—Antimonial Powder, *100 grains*; *Tartar Emetic 5* grains: rub together.

proper for the premonitory symptoms are the same as those found efficacious in common diarrhœa; that the most simple remedies will suffice, if given on the first manifestation of this symptom; and that the following, which are within the reach and management of every one, may be regarded as among the most useful: namely—20 grains of opiate confection, mixed with two table-spoonfuls of peppermint water, or with a little weak brandy and water, and repeated every three or four hours, or oftener, if the attack is severe; or an ounce of the compound chalk mixture, with 10 or 15 drops of laudanum, repeated in the same manner: from half a drachm to one drachm of tincture of catechu may be added to this last *if the attack is severe.*

"Half these quantities should be given to young persons under 15, and still smaller doses to infants, &c.

(Signed) . CARLISLE,
E. CHADWICK,
S. SMITH."

Cholera must be a disease simple in its form, and mild in its symptoms, when it yields so readily to these, the simplest of remedies. What explanation can the members of the General Board of Health give, for 12,000 persons of all ages, male and female, having been swept away, in the course of six or eight weeks, in Great Britain alone? What explanation can the noble Earl, the President of the Board, and his colleagues, give, when the victims of cholera lie numbered not by hundreds, but by thousands, in an island where opiate confection and weak brandy and water,—where compound chalk-mixture, laudanum, and tincture of catechu,—such efficacious medicines in subduing cholera in its early stages, were within the reach of every one? The rates of mortality prove too clearly that they have erred in opinion. The same rates prove too clearly that the public has been misled by the representations of the members of the General Board of Health. The harmonious agreement of opinion among medical authorities, proclaimed by the General Board of Health, is in reality the harmony of discord. The unanimity of opinion as to the treatment to be adopted in cholera, is the unanimity of antagonistic conflicting

opinions. The unheard-of discovery made by the noble Earl and his medical colleagues is worthy of being recorded in the medical literature of Great Britain.

In all discharges from the bowels—serous, mucous, or sanguineous; sero-mucous, muco-sanguineous, or sero-muco-sanguineous; whether such be designated by nosologists as acute or subacute diarrhœa, acute or subacute dysentery, acute, or mild English, or Asiatic cholera—there is no plan of treatment which will bear comparison with the extensive abstraction of blood, by cupping, from the surface of the abdomen, and the action of lunar caustic brought into immediate contact with the surface of the inflamed and secreting mucous membrane.

Case XXI.—Bhola Naick, 4th Company, 5th Infantry, Gwalior Contingent, was sent in from the out-station of Balabihut, in the district of Chundeeree, on the 22nd November, 1849. He had been seized with violent purging on the morning of the 21st. On admission into the Regimental Hospital at Lullutpoor, the discharges from the bowels were clear and sero-mucous in appearance, mixed with flakes of lymph, and containing a thick sediment. He was sunk and exhausted. The skin of his face was pinched backwards, giving a sharp and peculiar cast to his features. Thirst was urgent. The pulse ranged between 120 and 125; and was small, sharp, and wiry. The extremities were cold; the abdomen was sunken. The number of stools passed since the attack were stated by him to have been twenty-eight or thirty. Within an hour after his arrival four liquid stools were passed. He did not suffer from vomiting, nor from spasmodic contractions of the muscles.

The treatment adopted consisted of cupping over the surface of the abdomen, and the administration of caustic pill, No. 3. The cupping was succeeded by the application of a blister, which was afterwards dressed with mercurial ointment. A second pill was ordered, and with each pill as much cold water as the patient could drink.

The sero-mucous secretions from the bowels were checked; thirst was allayed; the pulse fell to 90, and expanded in volume; heat returned to the extremities; the absorption of

the mercury into the system was quick and unexpected; the gums became spongy, and the breath fetid. Beyond this the mercurial action was not pushed. As the bowels were not moved except by the aid of a mild purgative draught, he was pronounced convalescent on the fourth day after admission.

Case XXII.—Sawut Sing, Sepoy, 6th Company, 5th Infantry, Gwalior Contingent, was admitted into hospital at Lullutpoor, on the 5th November, 1849, having been purged twelve times previous to his removal. The discharges from the bowels were thin, sero-mucous, and mixed with blood. The pulse was quick, small, and wiry, 130 in the minute; the tongue was red. He suffered from thirst. The extremities were cold; the abdomen was sunken. He was so completely exhausted that with difficulty he spoke. The voice was feeble. He did not suffer from vomiting, nor from cramps, nor from suppression of urine.

He was cupped extensively over the abdomen; blood flowed freely. Caustic pill No. 3 was washed down with a quart or more of cold water given at short intervals. The pill was repeated in the evening.

After the first pill he had four liquid discharges from the bowels, tinged with blood. On this account the pill was repeated. After the second caustic pill the discharges were checked. The bowels did not act until a purgative draught was prescribed. The pulse fell to 96, and expanded in volume. Heat returned to the extremities. His recovery was satisfactory.

ABSTRACT OF CASES OF SEROUS, MUCOUS, AND SANGUINEOUS DISCHARGES FROM THE INTESTINAL CANAL, TREATED BY CUPPING EXTERNALLY, AND LUNAR CAUSTIC INTERNALLY.

Names and Ages.	Date of Attack.	Character and number of liquid discharges from the intestinal canal.	Chief symptoms attending the discharges from the bowels.	Treatment.	Results of treatment. Effects produced on the symptoms and state of the bowels.	GENERAL REMARKS.
Case 23. Bahadur Sing, Sepoy, 1st Co. 5th Infantry, Gwalior Contingent.	Admitted, with symptoms of fever, on 5th Nov. 1849. On the 7th violent purging set in.	Nine liquid discharges in the course of 13 hours—sero-mucous and deeply tinged with blood.	Thirst urgent. Pulse 120, small, contracted, wiry: tongue red and glazed. Burning heat of skin. Pain in the abdomen; griping. Restless and anxious.	Cupping extensively over the abdomen. Lunar caustic pill No. 3 washed down with copious draughts of cold water, or warm water if preferred.	One sero-mucous discharge in the course of 24 hours, free from blood. Pulse fallen from 120 to 89, full and soft. Thirst allayed. No return of the slimy discharges from the bowels.	At the onset of the purging a rhubarb draught, with laudanum, was given. This was followed by blue pill and Dover's powder. The discharges from the bowels, however, increased in quantity and in frequency. The treatment was then changed. He was discharged convalescent on the 11th.
Case 24. Lahadut Khan, Sowar, 1st Troop, 1st Cavalry, Gwalior Contingent.	13th Nov. 1849.	Nineteen copious, liquid, muco-sanguineous stools in 24 hours. Colour deeply dyed of a blood-red. Flakes of lymph and shreds of mucus floated in the fluid.	Extreme exhaustion. Pulse less. Spasmodic twitches in the muscles. Thirst insatiable. Eyes sunken in their sockets. Extremities cold. Skin of the fingers and toes shrivelled. Urine not suppressed.	Cupping. Caustic pill No. 3 to be repeated. Blister to the abdomen, to be dressed with mercurial ointment.	Discharges checked, and the cramps relieved. On the 14th, two liquid stools, slightly tinged with blood were passed. On the 15th, none. On the 16th, none. The pulse returned. A warm perspiration broke out over the body.	After the second gush of muco-sanguineous fluid, he was ordered 5 grs. of calomel, and ½ grain of opium, every 3rd hour. He swallowed 4 pills. A mustard cataplasm was applied over the stomach. The discharges from the bowels, rapidly increased. After the 19th stool, the treatment was changed. The mercury was rapidly absorbed into the system by the raw blistered surface. The gums became spongy. The breath foetid, and salivation followed.

ABSTRACT OF CASES—*continued*.

Names and Ages.	Date of Attack.	Character and number of liquid discharges from the intestinal canal.	Chief symptoms attending the discharges from the bowels.	Treatment.	Results of treatment Effects produced on the symptoms and state of the bowels.	GENERAL REMARKS.
Case 25. Umur Anesty, Sepoy, 6th Company, 5th Infantry, Gwalior Contingent.	15th Nov. 1849.	Ten liquid sero-mucous discharges from the bowels in the 24 hours, mixed with flakes of lymph, and a muddy deposit in the pan for five consecutive days.	Pulse 100, hard, sharp, and wiry. Thirst urgent. Anxiety. Prostration of strength. Griping and tenesmus. Tongue red and glazed.	Cupping over the abdomen. Caustic pill No 3, morning and evening. Hot or cold drinks to be supplied when desired by the patient.	Freqoency of the discharges diminished from 10 to 3, after the 3rd pill. Checked entirely after the 5th pill. when the medicine was stopped.	When taken to the hospital he received a rhubarb draught, with laudanum. On the 16th and 17th, blue pill and Dover's powder were ordered. No impression was made on the state of the bowels. The treatment was changed. The pulse fell to 84, and expanded in volume. A perspiretion broke out over the body. He was discharged convelescent.
Case 26. Mattra Tewary, Sepoy, 2nd Company, 5th Infantry. Gwalior Contingent.	24th Oct. 1849.	The complaint commenced with 5 stools in the day, and 6 in the night On the 24th 12 liquid slimy stools were voided in the course of 12 hours. They were tinged with blood, and loaded with flakes of lymph and an asben-grey coloured sediment.	Thirst insatiable. Restlessness Anxiety. Prostration of strength. No appetite. Urine sceanty, and high coloured. Pulse 125, small and thrilling. Tongue loaded and clammy.	On the 26th he was cupped over the abdomen, and was ordered caustic pill No. 3, to be washed down with large draughts of cold water.	In the 24 hours preceding the cupping, 13 copious sero-mucous stools were passed from the bowels. From the 26th to the 28th, after the caustic pill the bowels were moved once.	A rhubarb draught, with laudanum, blue pill, and Dover's powder, with astringents, were tried in the first instance. They failed in checking the purging. The results of cupping and lunar caustic were so far satisfactory that the Sepoy was discharged from the hospital, at his own request, on the 29th Nov. 1849.

Case 27. Ajoodhea Sipahi, 3d Company, 5th Infantry, Gwalior Contingent.	22nd Oct. 1849.	Complaint ushered in by 7 stools in the day, and 6 in the night. On the 23d, 6 in the day, and 11 in the night; total, 17 liquid stools in the 24 hours. Sero-mucous, and of a reddish tinge.	Thirst moderate. Griping and tenesmus. Quick and wiry pulse. Restless and anxious. Loaded and clammy tongue.	On the 24th, was cupped: and was ordered caustic pill No. 3.	In the 24 hours preceding the cupping and pills, 17 liquid evacuations were passed. From the 24th to the 26th, one discharge of a sero-mucous character was voided.	The astringents employed to check the purging failed. The irritability of the bowels increased on the 23d. The plan of treatment was changed. The results arising from the cupping and caustic pills were so far satisfactory, that "convalescent" was written opposite his name on the 26th November, 1849.
Case 28. Ram Sing, 25 years.	20th Sept. 1849.	Profuse slimy, sero-mucous stools, passed 20 times in the 24 hours. Examined with the aid of a lens, lymph and mucus, in considerable quantity, were noticed.	Prostration. Heat of skin. Foul tongue; thirst; restlessness and general fever. Pulse 110, throbbing. Pain in the iliac regions. Scanty and high-coloured urine.	Cupping. Lunar caustic pill No. 3, morning and evening.	Cessation of the violent purging after the 2nd pill. Pulse reduced to 80, soft. Perspiration over the body. Copious flow of urine.	Without wasting time, and trifling with the symptoms, by administering laudanum, &c. this man was cupped, and had the caustic pill. He returned to his village on the 3d day.
Case 29. Jéwari Pundit, prisoner. 50 years.	20th Nov. 1849.	Looseness of the bowels; three thin slimy discharges in the night, and three in the day. Liquid passed the same as in Case 28.	Furred tongue; quick pulse. Thirst urgent. Pain and griping in the bowels. Scanty urine, high-coloured, but not suppressed.	On the 24th, 1 caustic pill No. 3. On the 4th Dec. cupped and ordered caustic pills morning and evening, blistered.	The number of stools was reduced to one in the 24 hrs. From the 26th to the 30th the bowels were not moved once. On the 4th December purging returned, which called for the treatment noted.	From the 20th to the 24th Nov. the treatment consisted of opiates and astringents. The caustic pill was substituted when the purging continued. For four days the bowels remained totally inactive. The return of the sero-mucous stools rendered it necessary to cup and blister. Recovery soon followed.

Names and Ages.	Date of Attack.	Character and number of liquid discharges from the intestinal canal.	Chief symptoms attending the discharges from the bowels.	Treatment.	Results of treatment. Effects produced on the symptoms and state of the bowels.	GENERAL REMARKS.
Case 30. Jubra Soner, prisoner. 30 years.	29th Nov. 1849.	Seven stools in the day and 5 in the night; thin slimy, sero-mucous, and deeply tinged with blood. Flakes of lymph and shreds of mucous, in considerable quantity.	Thirst insatiable. Dry and crisp tongue, glazed. Small and thready pulse, 125 to 130. Pinched features; cold extremities. Griping pains in the abdomen. Urine secreted.	Cupped extensively. caustic pill. No. 3. Blistered, and dressed with mercurial ointment.	The evacuations reduced from 13 to one. This was passed on the morning of the 30th Nov. In the evening, a second evacuation more healthy in colour and consistence, and free from blood, was passed The pulse fell to 90.	No delay took place in the remedial measures employed. This prisoner was cupped at once, and was given the caustic pill. with large draughts of cold water. He was then blistered. Mercurial action set in on the 3rd of December. His recovery was satisfactory.*

* *Note.*—The preparations of morphine with lunar caustic appear to exercise a decided control over the secretions from the gastro-intestinal canal in cholera, dysentery, and diarrhœa. Since the publication of these notes in the London Medical Gazette, I have used with marked benefit, pills composed of

Lunar caustic,	5 grains.
Acetate of morphia,	2½ ,,
Emeticised antimonial powder,	30 ,,

divided into 10 pills—one pill to be given every 3d or 4th hour after copious draughts of cold water,—until the discharges are checked. In cases where the urgency of the symptoms call for active and immediate treatment. 2 pills instead of 1—have been administered for a dose—or, one pill containing double the quantity of lunar caustic, acetate of morphia, and emeticised antimonial powder. A single pill with the requisite quantities of medicines, is preferable.

The serous, mucous, and sanguineous,—the sero-mucous, muco-sanguineous and sero-mucous-sanguineous discharges of fluid from the intestinal canal, mixed with flakes of lymph and with shreds of inspissated mucus, could not have been voided, in the cases registered in the foregoing Abstract, unless there had existed a *fretted*, an irritable, an inflamed condition of the whole, or of some one part of the gastro-intestinal mucous membrane, glandular bodies, and subjacent tissues. This is the point which must be borne in mind. The extent of mucous surface engaged, constitutes the sole differences between diseases closely allied, which may be ranked in one and the same family. The limited extent of surface from whence the sero-mucous discharges were eliminated, rendered the cases recorded tractable to treatment.

The first gush of sero-mucous fluid from the stomach and intestinal canal has been called the premonitory diarrhœa of cholera: this is an error. The members of the General Board of Health in London have fallen into this mistake in their notification on the subject of cholera. If it can be proved that a few inches of the intestinal canal above and below the cæcum caput coli, involved in a fretted, and irritable, and sero-mucous eliminating condition of its structures, is the point of departure for the spread of an extensively diffused inflammatory action upwards towards the stomach, and downwards towards the rectum, then may diarrhœa be regarded as the forerunner of cholera.

This theory will not stand the test of examination. The first gush of rice-water fluid from the stomach, and the first gush of rice-water fluid from the bowels, may be regarded, not as the *avant courier* of an attack of cholera, but *as the transit of the first into the second stage of the disease*, and originate in the rapid, the almost instantaneous development, of a bright scarlet, or deep crimson red efflorescence, diffused over the internal surface of the stomach, the duodenum, the jejunum and the ileum intestines.

The premonitory diarrhœa,—with which the noble lord the Earl of Carlisle, President of the General Board of Health, and

his medical colleagues, Mr. Chadwick and Dr. Smith, appear to have been fascinated,—bears to the first and second stages of cholera as strong a degree of relationship as the flame of a farthing rushlight bears to the fiery blaze of a potter's furnace.

To extinguish that blaze they propose to add fuel to the fire.

Cholera a non-contagious disease: its origin.—The impression abroad is erroneous, that cholera is a visitation of recent date. Mankind, lay and professional, may rest assured that, from the hour the Almighty Creator of the universe breathed into man's nostrils the breath of life, the mucous membrane, and subjacent tissues of his stomach and intestinal canal, were as likely to be attacked with diffused inflammatory action as in this, the year of our Lord, 1849-50. The public may rest assured that, so long as this world is peopled with human beings, or with a brute creation possessed of a stomach and an intestinal canal, their structures will continue to secrete serum, mucus, and lymph; and through their sieve-like tissues will percolate the saline ingredients of the blood. This, with its concomitant symptoms, is cholera: whether it occur in man or in beast, the results are nearly the same.

In the Israelitish camp, 1471 years before the commencement of the Christian era, cholera must have made its appearance. In the encampments of the tribes of Israel, thousands were swept away in the space of a few hours by a disease incorrectly translated the "plague." The term is incorrect, and has caused confusion. In the record of the miracles wrought by Moses, the Israelitish law-giver, in the presence of Pharoah the king of Egypt, the term "plague" has been so far correctly used by the translators of the Old Testament, that at the present time the disease is recognised and described under the same name. There can be no difference of opinion as to the Egyptian "plague" of 1849 being precisely the same form of disease as the plague with which the land of Egypt was scourged in the reign of Pharoah. The description of the plague-proper, in the 19th chapter of Exodus, is accurate. The disease is described as "a boil breaking forth with blains upon man and upon beast, throughout all the land of Egypt." The

translation of the second form of disease by the term "plague" is erroneous, because there is no form of epidemic which could have broken out suddenly in an encampment of the Israelites, which could have swept them away by thousands, and by tens of thousands, in the course of twenty-four or forty-eight hours, which could have disappeared entirely, or ceased as suddenly and unexpectedly, as it developed itself, save one:—that epidemic was, and is, cholera.

Divines, the ministers and interpreters of the religion of Christ, may not coincide in these views. Whether they assent or dissent, the question still remains one of opinion. It must be confessed, however, that the sudden and unaccountable cessation of the disease or plague in the camp of the Jews, after it had thinned their ranks, is strong presumptive evidence in favour of the identity of the Jewish epidemics in 1471 and 1472 B. C. and our annual epidemics in Indian villages, towns, cities, and cantonments. The sudden change from pestilence and death to a state of health, attributed to the exertions of Aaron, then, as now, may have originated in a shift of the Jewish camp,—in a change of wind,—a heavy fall of rain,—or in a thunder-storm, by which the pestilential state of the atmosphere was dispelled.

The passages in Holy Writ referring to the epidemic translated "the plague," may be found in—

Numbers, chap. xvi., v. 46, et seq.—Year B. C. 1471; deaths, 14,700.

46. "And Moses said unto Aaron, Take a censer, and put fire therein from off the altar, and put on incense, and go quickly into the congregation, and make atonement for them: for there is wrath gone out from the Lord: the plague is begun.

47. "And Aaron took as Moses commanded, and ran into the midst of the congregation; and, behold, the plague was begun among the people: and he put on incense, and made an atonement for the people.

48. "And he stood between the dead and the living; and the plague was stayed.

49. "Now, they that died in the plague were fourteen thou-

sand and seven hundred, beside them that died about the matter of Korah."

Numbers, chap. xxv., v. 8.—Year b. c. 1452; Deaths, 24,000.

8. "And he (Phinehas) went after the man of Israel into the tent, and thrust both of them through,—the man of Israel and the woman, through the belly. So the plague was stayed from the children of Israel.

9. "And those that died in the plague were twenty and four thousand."

II. *Kings*, chap. xix., v. 35.—Year b. c. 710; Deaths, 185,000.

35. "And it came to pass that night, that the angel of the Lord went out, and smote in the camp of the Assyrians an hundred and four-score and five thousand: and when they arose early in the morning, they were all dead corpses.

36. "So Sennacherib, king of Assyria, departed and went, and returned, and dwelt at Nineveh."

In the year 1471, before the birth of Christ, Aaron is represented as standing between the living and the dead, and the plague was stayed. The expression is metaphorical. The description of the staying of the plague, in this written record, is oriental in its origin. Those who have witnessed, or have formed part of an Indian encampment, where 80 or 100,000 human beings have been congregated together, will at once perceive that a separation between the living and the dead could be effected solely by the march of the living from the scene of death. In the march of the Israelitish camp, and consequent shift of ground, the pestilential locality and its victims—the dead corpses, in Scriptural language—were left in the rear.

There is nothing wonderful nor miraculous in an event of this nature. The instinct of self-preservation urged the Jews to a hasty march from an encamping ground, to have remained in which would have been certain death. The strongest, the stoutest, the healthiest, once seized with the epidemic, were smitten down in a few hours by an invisible death-stroke. The same occurs, yearly, in some one part of the Indian continent. In Lower Bengal I have resided within a few miles of villages

where the cholera has broken out. When a fourth of the inhabitants had been swept away by its ravages, in the course of eight-and-forty hours, the remainder have rushed out in a body, with their wives, and children, and cattle. The villages have been deserted; a living soul did not remain behind in the ill-fated spot.

Time was allowed to elapse, until, in the opinion of their pundits, the wrath of the offended deities had been appeased, and the scourge had ceased. On their return to the villages they felt secure, and, as far as I could ascertain, seldom suffered from a fresh outburst of the cholera in an epidemic form. During their absence the state of the atmosphere, surcharged with noxious pestilential vapours, had undergone a change. Hence the cessation of the cholera, and the freedom from its attacks enjoyed by the villagers, after their return.

Holy writ does not stand in need of facts, such as the recorded epidemics in the Israelitish camp, so obvious and so easily explained, being distorted by the views of divines, and shrouded in the mysteries of miraculous agency. Holy writ does not need to exact from mankind an unconditional belief in the interposition and operation of miraculous agency, as to the origin, progress, and termination of a terrific epidemic scourge, when its sudden outburst and its sudden cessation can on reflection be accounted for in a manner perfectly rational, and consistent with the principles of religion.

The studied endeavours of writers to prove that cholera is a disease of recent development amongst the human race, have induced me to refer to the epidemics in the camp of the Israelites during their journeyings to the land of promise, as reasons for dissenting from their views. The fatal scourge or plague in the camp of the Jews must have been cholera, and no other form of disease.

This leads me to the non-contagious character of cholera.

The experience of the majority of writers and observers, professional and non-professional, has established the fact that cholera is dependent upon, influenced by, and propagated through the medium of certain atmospheric changes. Their observa-

tions prove that cholera does not spread by contagion, nor by infection—that is, the disease is not communicated from individual to individual by direct contact, but spreads and commits its ravages through the influence of the atmosphere.*

Others there are who entertain a different opinion. This class of theoretical contagionists is not numerous: their theories even are not well-grounded: their views of the origin of cholera as an epidemic or as an endemic disease, are not comprehensive nor consistent: the facts upon which they ground their opinions, as to the contagious and infectious properties of cholera, tell equally in favour of the opinions against which they

---

* After the second death from cholera the prisoners were removed from the jail into tents, and marched off to a short distance from cantonments. The jail was closed, white-washed, and purified. The prisoners suffering at the time from the effects of cholera, or seized with the disease afterwards, were transferred to the Regimental Hospital. If cholera were infectious or contagious,—if a fretted and irritable, a crimson-red efflorescence, and sero-mucous eliminating condition of the mucous membrane from the stomach to the rectum were a disease communicable from one person to another, by contact or close vicinage,—the transfer, being fraught with danger to the sepoys in the hospital, would have been unjustifiable and censurable.

Contagionists would have drawn a quarantine boundary line round the hospital, and would have interdicted all intercourse with persons passing to and from the jail.

The hospital was crowded with patients. In the western verandah, when the centre ward and eastern verandah were full, several sipahis lay on charpoys between prisoners in the last stage of cholera. A single case of cholera did not occur among the sipahis who were in hospital at the time of the transfer. Nor did the disease exhibit itself in a single case admitted at any subsequent period with fevers, or ulcers, or contusions, or cutaneous eruptions. The case of Bahadur Sing, marked No. XXIII. in the Abstract, cannot be regarded as an exception.

The use of tartar emetic in the treatment of intermittent fevers was suspended for a short time, in consequence of vomiting and purging, having supervened in a few cases. Tartar emetic, in its effects on the constitution, was more decided and more speedy in its operation than at any time previous to the outbreak of cholera. If such effects can be attributed to the transfer of the cholera-patients from the jail to the regimental hospital, why be it so! The inconvenience was temporary, and was easily remedied.

combat. In the list of contagionists figures conspicuously the name of Professor Gravea, of Dublin. His reputatioo has been damaged hy the obstinate tenacity with which he adheres to the erroneous views expressed as to the contagious and infectious properties of cholera in his puhlished artieles.

The matured opinion of practicnl observers in India has set the question at rest, that cholera,—the true type of the Indian village cholera,—originates in and travels from locality to locality, not through the medium of personal contact, hut through the medium of an impure, a contaminated, an infected atmosphere: that such is the medium has been incontestably proved. The changes in the atmosphere account for the cessation, as well as for the prevalence of this form of disease during certain months of the year in India. They are sufficient to account for the outbreak of the same form of cholera in any other part of the globe hesides India. Farther, the cause assigned for its outbreak, without reference to the theories of contagion and infection, accounts for the peculiarities and eccentricities of cholera, starting into existence in one region of the globe,—travelling from thence by forced marches,—becoming diffused over the earth's surface,—ravaging every country by turn, and sparing neither sex nor age in its progress.

With facts such as these in prominent relief before our eyes, we may reasonably inquire, of what value, of what practical utility, are quarantine laws?

Quarantine laws have already doomed to death healthy and unhealtby alike, crowded together in the close, ill-ventilated holds of vessels. In ignorance of the laws of disease, and through stupidity, when nations were panic-stricken, quarantine laws were framed as safeguards against the invasion of disease regarded hy executive governments as infectious and contagious, and exotic to the soil. With the sacrifice of human life on board of vessels undergoing quarantine, have these laws proved operative in protecting the inhabitants on shore from the outbreak of disease, erroneously supposed to be conveyed from one port to another in the hulls of trading vessels? Have the quarantine laws proved operative in shutting out

from Great Britain, or from any port or state on the Continent of Europe, the malignant and erratic type of cholera when the state of the atmosphere on shore was favourable to its development,—was favourable to its springing into existence without extraneous aid from the pestiferous holds of vessels afloat?

These are simple, straightforward questions. Reply to them, if you can, advocates of the doctrines of cholera-contagion and of cholera-infection!

Past experience, sad and mournful though it be, has removed every doubt upon the subject, that quarantine laws have proved a gross delusion: they have proved ineffectual; totally inoperative as a safeguard against the invasion of cholera.

Quarantine laws, inoperative as a safeguard against the outbreak on shore of cholera, of typhus, of yellow fever, or of the plague, have inflicted the greatest miseries on the unfortunate passengers and crews, pent up in vessels, obliged to hoist the yellow flag. In the destruction of human life on board, quarantine laws have not proved inoperative.

Common sense has dictated, in the strongest and in the plainest terms, that when cholera or fever, the small-pox or the plague, have broken out on board-ship, the healthy and unhealthy should be separated without delay. Humanity—the laws of nature—point to the necessity of the speedy removal of the sick from the infected atmosphere on board to some healthy locality on shore. The experience of medical men practically acquainted with the essential character of the diseases for the exclusion of which quarantine laws are maintained in full force, has long since decided that, if the atmosphere on shore be infected, the detention of the healthy, the sick, and the dying, in the holds of vessels undergoing quarantine, cannot hasten nor retard the outbreak of epidemic diseases on shore. Experience has also set at rest, that, if the atmosphere on shore be not infected—if the atmosphere on shore be not surcharged with noxious, pestilential vapours,—the removal of the sick and healthy from vessels afloat, as well as the discharge of their cargoes, cannot produce the changes in the at-

mosphere generative of those epidemic diseases against which quarantine laws have been framed.

That cholera owes its origin to, and starts into existence from, certain changes in the atmosphere, scarcely admits of a doubt. With the periodic changes in the seasons, and at those seasons of the year when strong and regular currents of wind do not sweep over the face of the land, cholera may rage as an epidemic or as an endemic disease. In this respect cholera is not singular. At such time, when the purifying influence inherent in and exercised by strong currents of wind in dispersing accumulated exhalations from the soil is suspended, as well as when the atmosphere is surcharged with the devitalising principles of carbon, of sulphuretted hydrogen, and of other devitalising noxious vapours, generated in and exhaled from the soil, other types of *acute inter-tropical diseases*,—*fever, dysentery*, or the plague,—may ravage whole districts with greater destruction to human life than the worst type of cholera.

Cholera, when it rages on ship-board, is subject to the influence of the sea-breeze. Sea-faring, as well as medical men, can testify to the modified character of the disease at sea. In the effects produced by the fresh sea breeze, a transition takes place from sickness and mortality on board to a state of comparative health. I have already stated that this was the case on board the ship Sophia, when I proceeded to Mauritius in that vessel, in medical charge of coolies. A few solitary cases may occur in the interval of the three days' sail from the Sand Heads; but the symptoms do not present the same intensity of character, nor the same rapid tendency to a fatal termination, noticed in those attacked off Calcutta.

Another observation is worthy of record. During the prevalence of the south-west monsoon in the Bay of Bengal, cholera is known to disappear from a vessel much sooner than in the north-east monsoon. The south-west monsoon blows fresh up the bay: the north-east monsoon blows down the bay, from the river and land. Hence it is not unreasonable to infer, nor do we travel far beyond the limits of probabilities when we conjecture, that the breeze blowing from the land still retains,

and is strongly impregnated with, the poisonous miasmata generated in and exhaled from the decomposed vegetable matter, and from the low swampy ground on either side of the river Hooghly at its entrance.

In mountainous districts, and in districts situated at the base of a hilly range, and lying to leeward of the range, through which strong and regular currents of wind cannot circulate freely, cholera may and has become the endemic scourge of the inhabitants. In towns and villages, and cantonments in the plains, where a system of thorough drainage has been neglected, or a slovenly system of half measures in drainage is the rule and not the exception, the recurrence of cholera year by year may be looked for as a periodical visitation.

Within the tropics, the rapid and pestiferous exhalations from the soil, combined with certain properties inherent in particular descriptions of soil, appear to be intimately connected with that state of the atmosphere which predisposes to an attack of the mucous membranes in preference to subjecting to its influence other structures in the body.

Examples illustrative of this marked predisposition to attack the mucous membranes may be found in the forms of disease by which the mortality amongst European troops, encamped in or marching through jungly districts, has been caused. In general, statistical returns furnish data from which no other conclusion can be arrived at than that the mortality among the troops has been caused by diseases directly or indirectly connected with the mucous membranes. The troops have been swept away by diseases which have broken out in the shape of cholera, of dysentery, of gastro-enteritic fevers, or in that form of disease closely allied in its symptoms to the Egyptian plague. Inquiries as to the causes of mortality amongst natives living close to those pestilential spots, confirm the conclusions that the diseases prevalent among men, women, and children, are those connected with the mucous membranes.

Why this should be is difficult of explanation. The same difficulty exists in accounting for the development of inflammatory action in the fibro-serous membranes in preference to

other structures, under an altered state of the atmosphere. This will be more distinctly understood by bringing forward a practical illustration.

The coolies who had been located on the sugar estates in Berbice and Demerara were embarked in the ship Louisa Baillie for the port of Calcutta, without being provided with a supply of warm clothing for the passage. Avarice on their part, and parsimony on the part of the agents of the estates from which they were shipped, left the coolies in a state bordering on nudity, to undergo all the vicissitudes of the weather, from a calm to a hurricane. The Executive Government of British Guiana did not interfere, as the colonial Treasury could not be saddled with such an expensive item as the supply of clothing to Indian labourers, imported into the colony a few years before at the risk and for the benefit of private speculators.

Thus matters stood. Such is the gist of a subject which afterwards formed part of an inquiry by a parliamentary committee, in connection with the emigration of Indian coolies into the British West Indian Colonies. With the exception of bowel complaints, caused by the intermixture of verdigris with their food, sickness on board was slight, and the deaths from sickness few in number, until we reached the Cape of Good Hope.

The supply of water on board was running short. On the 25th of July, 1843, we sighted the Cape of Good Hope. On the 26th we entered False Bay in 18° 45, east longitude, and 34° 23′ 48″ south latitude. In beating up the bay, we narrowly escaped closing our voyage to Calcutta on the Anvil Rocks. They are invisible, sunken rocks,—a terror to mariners. A ripple, and then a breaker, warned us of our close approach to danger. The Anvil Rocks were close under our lee bow. In the evening we cast anchor opposite Simon's Town.

On the 2d of August, with a fresh supply of water in the ship's hold, but without extra clothing on the backs of the coolies, we weighed anchor, hoisted the sails, and beat out of False Bay in the night, against a strong south-easterly wind. With her head steering towards the southward, the Louisa Baillie, freighted with her living cargo of coolies, proceeded

on her voyage to Calcutta. It is necessary to be particular as to dates. With each degree of southing made, from the 2d of August to the 27th of the same month, the intensity of the cold increased. During this time hail-storms were frequent; the weather was freezing cold, the decks were covered with sleet; whilst the vessel kept scudding before the wind under a close reefed main-topsail.

The sufferings of the coolies were severe in proportion. But the structures attacked and brought under the influence of disease were not the mucous membranes, nor the parenchymatous tissues: they were the fibro-serous membranes of the joints, and of the cavities of the abdomen, the chest, and the head. In two cases, which terminated fatally in the course of fifteen hours, the peritoneum, the pericardium, and the pleura, exhibited, in the post mortem examination, a degree of intense vascularity. Their smooth and polished surfaces were coated with soft semi-gelatinous lymph recently exuded; their cavities contained serous fluid tinged with the red particles of the blood: flakes of lymph floated about in this serous fluid. The mucous membranes were healthy. The solid viscera were free from inflammatory action, with the exception of their fibro-serous envelopes. Whether the cases recovered, or whether they terminated fatally, the force of the disease was directed towards, and seemed to concentrate in, the fibro-serous membranes. Nor did any obvious change take place in the structures attacked until we crossed the line, in longitude 83° East, on the 12th of September, 1843.

There is no difficulty in assigning reasons for the sufferings of the coolies from the intensity of the cold. They needed warm clothing. The difficulty consists in assigning reasons for the fibro-serous membranes, of all other structures in the body, having been selected as the seat of acute inflammatory action.

The question remains to be solved, in like manner, why the mucous membranes should be selected for attack, and be subject to specific morbid changes, when the surrounding atmosphere is surcharged with noxious pestilential vapours. It must be confessed that in this respect our knowledge is limited.

In India, medical men are aware that the prevalence of a particular form of disease in a locality can in general be traced to the nature of the surrounding soil. Medical men are aware that in jungly uncultivated districts, in localities, where black and loamy soil, or a virgin soil topped with successive layers of decomposed vegetable matter, abound, health may be regarded as the exception, disease the rule. Through this description of soil, black, loamy, and impervious to water, rain does not rapidly filtrate. So long as the moisture of the ground is kept up to the point of thorough saturation, exhalations injurious to health do not appear to be generated. But, when a heavy fall of rain has been followed by a long-continued drought, the "avant courier," the forerunner of an epidemic scourge, impure, noxious, and devitalising exhalations are emitted by day and by night, in consequence of the powerful heat of the sun acting on a soil in the body of which so much moisture has been retained. In selecting sites for cantonments, or ground for encampments, military surgeons are aware that such localities ought to be avoided.

Again, in India, the sources from whence the cholera-producing changes proceed are numerous. Members of the medical profession, who have interested themselves in ascertaining the actual condition of the poverty-stricken people in this country, by strolling through Indian villages, and viewing, for their immediate information, the heaps of nuisances which meet the eye at every corner, can be at no loss to account for the prevalence of disease, and for the mortality which follows in the wake of disease in every village in India.

So far as heaps of manure; so far as cess-pools, half filled with stagnant water, and half filled with rotten vegetable garbage; so far as huts, closely crowded together, ill-ventilated, built on swampy undrained soil; so far as the wretched condition of the mass of the people, removed but one degree from actual starvation; so far as the carrion, half-devoured by the village scavengers, swine, and pariah dogs, kites, and vultures, can contribute to the production and propagation of disease, in Indian towns and villages, through the medium of a foul, infected,

pestiferous, and poisoned atmosphere:—such they fail not to do.

To propose a remedy for these evils would be equivalent to effecting a thorough reformation in the sanitory condition of India. The cleansing of the Augean stables, a work of Herculean labour, would dwindle into insignificance, compared with the cleansing of Indian villages in a single district.

Of all this we possess the strongest proofs: yet we are forced to return to the point from whence we started, without being able to assign a convincing reason for acute inflammatory action being developed in the mucous structures, in preference to the fibro-serous membranes, and *vice versâ*, under the influence of an altered state of the atmosphere.

The admixture of noxious, devitalising vapours with the blood, through the pulmonary tissue by inhalation, and through the cutaneous surface by absorption, whether generated in the earth, or emitted from any other source, approximates as closely to a rational explanation for the onthreak of an epidemic scourge in a particular locality on shore, or in the hold of a vessel afloat, as need be assigned. For practical purposes more is not needed. The subsequent attraction or determination of the vital fluid thus impregnated to the capillaries and surface of the mucous membranes in one instance,—to the capillaries and surface of the fibro-serous membranes in another instance, may be left to speculative theory and theorists, in so far as mankind will derive any benefit from the discovery.

Art. II.—Notes on the use of Tartar Emetic in the Treatment of Intermittent Fevers.

The results of the treatment of uncomplicated intermittent fevers with tartar emetic have been satisfactory—more so than could have been anticipated.

From the number of cases of intermittent fever—or, as the disease is commonly called, "fever and ague"—which have been discharged cured, within the last two years, from the Regimental Hospital of the 5th infantry, Gwalior Contingent, treated by tartar emetic, I willingly bear testimony to its value in the treatment of intermittent fevers.

As a remedial agent in the treatment of intermittent fever, an impression has been made on my mind, that tartar emetic is preferable to quinine,—to arsenic,—to bark in powder,—or to any other medicine hitherto employed by me in the treatment of these diseases.

Tartar emetic has been administered in nauseating doses, prior to the first stage of the fever, or the stage of invasion. It has been continued during the second or hot stage,—the stage of excitement. It has been continued during the third or sweating stage,—the period of the fever's crisis and decline.

The exhibition of tartar emetic in the treatment of intermittent fevers has been deferred until the bowels have been freely purged by pills or powders of calomel and jalap, followed by the common mixture of senna and Epsom salts. This preparatory evacuation of the bowels by calomel, jalap, or by some other equally active purgatives, has been invariably observed. It is a standing order in the regimental hospital.

When it has been ascertained that the intermittent fever is not complicated with inflammation of the viscera of the thorax and abdomen, the lancet, leeches, and the cupping instrument, are kept in reserve until such inflammations become developed.

These preliminary steps taken, the administration of tartar emetic is commenced after the first paroxysm of the fever has clearly declared itself; the proportionate dose of the medicine

for each patient during the progress of the fever being regulated by mixtures marked A, B, C, D, E, of which an ounce every half hour or an hour is a dose. A, contains one grain of tartar emetic to one-hundred ounces of water. B, one grain to fifty ounces. C, one grain to twenty ounces. D, one grain to ten ounces. E, one grain to five ounces.

The advantages to be derived from regulating the doses of tartar emetic in this manner consist in having the means at hand to keep the patient's system under the influence of the tartar emetic, without producing any violent effects on the stomach and bowels either by vomiting or purging.

The chief object to be kept in view is, to prostrate the patient's strength so completely, that when the first stage of the fever, or the stage of invasion, has commenced, it must work on the patient's system, debilitated by the nauseating doses of the tartar emetic. In like manner, the prostration of the patient's system is kept up during the progress of the second and third stages of the fever.

The value of tartar emetic as a remedial agent in uncomplicated intermittent fevers consists in anticipating the fever by prostrating the patient's system previous to the first stage, or the stage of invasion, setting in. In this respect tartrate of antimony and potash possesses advantages over all other medicines classed as emetics. The patient's system once brought under the influence of the medicine, can be kept in a state of extreme prostration by the administration of decimal and centesimal subdivisions of a grain repeated at short intervals without the effects of vomiting and purging being produced.

The centesimal subdivision of one grain of tartar emetic is more suited for children and weakly females than adult males. On this account the mixture has been introduced into the list. When so small a quantity of tartar emetic fails in producing any effects on the system, mixture B, or the fiftieth part of a grain of tartar emetic, can be substituted. The mixture most frequently used in the Regimental Hospital of the 5th infantry is that marked D in the list, or the decimal subdivision of a grain repeated every hour.

The quantity of the tartar emetic can be increased or diminished by chenging the mixture, and by shortening or lengthening the intervels of time at which each dose is given.

In three-fourths of the patients thus trested with tartar emetic, the attacks of intermittent fever, if not cnt short et once, have heen modified. Except in very obstinate cases, each recurring paroxysm has exhibited fewer marks of the acute form of the disease; end, in point of duration, each stage of the fever hss undergone a modification. In the simple uncomplicated form of intermittent fever, blood-letting has never heen prescribed, nor has hark in any form been ordered. In cases of intermittent fever complicsted with congestion and inflammation of one or more of the internal viscera, the lancet, leeches, and cupping, have been freely resorted to in order to aid the effects of the tartar emetic.

Occasionally it happens that if the duration of the fever—quotidian, tertian, quartan—be protracted, the patient's system becomes hahituated to the tartar emetic. A mixture in which helf a grain of tartar emetic has heen ordered every hour has failed to prodnce the effect of prostration, vomiting, purging, or sweating.

Under these circumstances it is useless to persist in prescribing tartar emetic. The medicine must be omitted. The loss of its influence in prostreting the patient's strength, and in arresting the fever during its different stages, is hut temporary. 12 or 15 leeches ought to be applied to the epigastrium and over the liver; or, the quick abstraction of 15 ounces of hlood from the epigastric and hypochondriac regions, hy mesns of two or three cupping glasses applied at the same time, should be resorted to. This mode of local depletion is preferahle to the application of leeches. Calomel and antimonial powder, five grains of each; or, calomel and James's powder, in the same quantities, given at bed-time; and on the following morning a purgative dranght, or purgative mixture, into which compound jalap enters, may be prescribed every fourth hour, until free evacuetions from the bowels have been produced.

Further treatment of the disease is suspended until a fresh

paroxysm of the fever has distinctly declared itself. The tartar emetic is then resumed, and prescribed in the decimal subdivisions of a grain, as in mixture D. This temporary suspension of the tartar emetic, and change in the treatment, has generally succeeded in producing favourable results.

Tartar emetic is a medicine well worthy of an extensive trial in the treatment of intermittent fever. Unaided, it has seldom played false in subduing the uncomplicated form of intermittent fever, however severe. Aided by the lancet, by cupping, or by leeches—aided also by mercurial purgatives—it has seldom failed in its duty, to either patient or physician, in cases of intermittent fever complicated with congestion and inflammation of one or more of the internal viscera.

The modes of treating intermittent fevers in different parts of the world vary according to the experience of medical men. When Twining lived, he practised blood-letting at the commencement of the cold stage of the fever. He has recorded the results of his practice, and has written in raptures of the success of blood-letting in intermittent fever. Others, we have been informed, deified calomel. The voice of the public is decidedly in favour of bark in some form or other. Each one recommends his favourite medicine, as *the* remedy for ague. We cannot doubt that medical men speak and write in sincerity, and record for the benefit of their fellow-men that which they have found from experience to be useful. Upon this principle I place on record the experience I have now had in the treatment of intermittent fever with tartar emetic. I do not recommend this medicine as a *specific*, as a potent infallible cure for this type of fever. Quacks trade upon, and noodles in the profession allow themselves to be befooled by such popular delusions.

Twining.—"At the same time, that we are administering purgatives, if the different stages of the paroxysms be severe, and attended with distressing symptoms, affecting either the head, chest, or abdominal viscera; it will be most important that the practitioner makes arrangements to be so near his patient, when the cold stage comes on, that he may take some

blood from the arm at the commencement of the rigor, or first when the coldness and shivering are completely established. The quantity of blood requisite to be taken from a patient in the cold stage of an intermittent, must be determined by its effects on the rigor; and may be regulated in some degree by the size of the subject, and the existing plethora of his constitution. I know of no rule by which we can estimate exactly how much blood it will be requisite to take from any patient. In general it is sufficient to take 12 or 16 ounces from a European of middle size; on the most robust subjects I would limit the quantity to be taken at one bleeding during the cold stage to 20 ounces. In Bengalees I find from 4 to 10 oz. sufficient in general to arrest the paroxysm. I would not advise above 20 oz. of blood to be taken in the cold stage from a European, or 12 oz. from a native, whether Hindoo or Mahommedan, unless there existed some cause independent of ague, to authorize the abstraction of the greater quantity. We must remember, that at low marshy stations in the humid atmosphere of Bengal, the abuse of V. S. is liable to produce the evils dependent on predominance of the lymphatic temperament: more especially if the blood-letting be employed to excess, or without sufficient cause, in aged persons who have been suffering recently from mental distress, or failure in business.

"The benefit of bleeding in the cold stage of intermittent fevers is now so well known in India, that I hardly need say that in a great number of cases, it arrests the paroxysm, and is the best mode of preventing those ulterior visceral engorgements, and indurations, which too often prolong the disease till the constitution is ruined. The patient should be bled in the recumbent posture, and permitted to lie quiet for an hour after the bleeding, and during the paroxysm he should not be heated with too much bed clothes, but may be allowed a blanket in the cold season, or a sheet in the hot weather: he should be supplied with a cup of warm tea, or gruel, or thin sago, soon after the blood had ceased to flow. By these means he will seldom have either a hot or sweating stage, and the

majority of patients who have used a sufficient course of mild purgatives before the bleeding, will not have a return of the paroxysm; provided they are tolerably well furnished with clothing, and not exposed to atmospheric vicissitudes.

"It is advisable to mix 3ss or 3i of aromatic spirit of ammonia, with 1½ oz. of tepid water, and to have it ready before opening the vein of an emaciated or weakly person in the cold stage; but not one patient in 20 is desirous of any stimulant after the bleeding. They generally prefer a cup of warm tea, and I think there is an advantage in allowing it. If a patient be much covered with blankets, and supplied with tepid drink in abundance, after the rigor has been checked by V. S., and if a free perspiration be thus kept up for some time, he is much more likely to have a return of the paroxysm.

"The requisites to ensure the success of bleeding during the rigor are—1st, The preliminary course of moderate purging; 2nd, That the blood be taken from a large orifice, quite as soon as the coldness and rigor are fairly established; 3rd, That the patient be bled in the recumbent posture, and no more blood taken than is sufficient to arrest the paroxysm."—*Twining's Diseases of Bengal.* Vol. II., pp. 210 to 212.

Annesley.—"The treatment of intermittents has reference to two particular states or periods of the disease, namely, during the paroxysm and the interval. If the symptoms of the cold stage of the paroxysm of intermittent be severe, they should be moderated, lest the internal organs and the powers of life be injured by its long continuance, and by internal congestions, especially in the brain, liver, spleen, and lungs, which frequently supervene during a severe cold stage of the paroxysm. Amongst the best means adapted to the moderation of the cold stage, are the hot or vapour-bath, followed by frictions of the surface of the trunk and of the extremities, the internal administration of warm stimulants, as camphor, ammonia, ether, warm wine, or warm brandy and water and other remedies of the same class.

"These means generally bring about reaction, or the hot stage, which usually terminates in a spontaneous crisis, gene-

rally in a copious perspiration, unless some local affection supervene in the course of the paroxysm and prevent its full development. When the vascular action in the hot stage is excessive, particularly if it be accompanied with great determination to the head with delirium or to the liver or spleen, with symptoms of inflammatory action in these viscera, we should resort to those remedies which are the best calculated to reduce it. Amongst these, the employment of general, or local blood-lettings is often serviceable, especially in the plethoric, in those lately arrived in the climate and highly fed. When general depletion seems to be too active a measure for the patient's strength, local depletions should be employed, and are always of *great service*. Under the above circumstances, either the one or the other ought to be resorted to, in order to guard important viscera from danger, and prevent the supervention of those internal congestions, obstructions, and inflammations, with which agues are so frequently complicated in the European constitution, when this means, and free purgation, are neglected in the early periods of the disease."—*Annesley's Diseases of India.* 2nd Edition, octavo, pp. 559 and 560.

Form of Register.

Name and Age.	Type of the Fever—No. of attacks previous to admission.	Commencement and termination of the first or cold stage, or the stage of invasion.		Commencement and termination of the second stage, or stage of excitement.		Commencement and termination of the third stage, or sweating stage.		Duration of the fever from the stage of invasion to the termination of the third stage.	Symptoms noted during the different stages of the fever.	Treatment.	Effects produced on the patient's system.	Duration of the fever after the administration of the medicine.	General Remarks.
		Com.	Ter.	Com.	Ter.	Com.	Ter.						
Mohammed Ally, 20.	Quotidian. 2d attack.	12. 30 P. M.	2. P. M.	2. 15 P. M.	4. 30 P. M.	5. 15 P. M.	5. 45 P. M.	5h. 15m.	Tongue loaded, clammy; rigors; chattering of the teeth; pulse 98; headache.	Purgatives on admission; tartar emetic mixture after 1st paroxysm.	Prostration of strength; nausea; no vomiting.	5 h. 15 m. when first prescribed.	The quotidian type of intermittent fever is particularly amenable to the tartar-emetic line of treatment. It is seldom necessary to give a stronger mixture than D, or the one-tenth part of a grain every hour.
	3d attack.	2. P. M.	2. 20 P. M.	3. P. M.	4. P. M.	4. P. M.	4. 30 P. M.	2. 30	Slight headache; symptoms improved; pulse 90.	Tartar emetic mixture.	Same effects.	2 h. 30 m. after its use for 24 h.	
Haider Ally, 24.	Alternate or every 2d day, 2d attack.	1. 15 P. M.	2. 30 P. M.	2. 45 P. M.	4. P. M.	4. 15 P. M.	6. P. M.	4. 45	Severe headache; thirst; foul tongue; quick and small pulse.	Purgatives first and tartar emetic afterwards.	Prostration of strength; nausea; no vomiting.	4 h. 45 m. when first prescribed.	The alternate type of intermittent fever, or that which attacks the patient every other day, is a very common form of disease amongst natives. In Bundlekund it prevails to a great extent. Tartar emetic is equally successful here.
	3d attack.	3. P. M.	7. 30 P. M.	3. 30 P. M.	4. 15 P. M.	4. 30 P. M.	6. 30	3. 30	Symptoms less acute.	Tartar emetic mixture.	Same effects.	3 h. 30 m. after its use during the 3d attack.	
Gunga Deen, 30.	Tertian, 2d attack.	11. A. M.	1. 15 P. M.	1. 30 P. M.	3. P. M.	3. P. M.	7. P. M.	8.	Sharp fever: symptoms acute.	Purgatives. tartar emetic.	Vomited twice; prostration; nausea.	8 h. when first prescribed.	This type is not so frequently met with as the two preceding. The tartar emetic is omitted in the intervals between the attacks. On the morning of the expected paroxysm of fever the medicine is commenced early, and continued during the whole day.
	3d attack.	1.	2.	2. 30	3.	3.	4. 30	3. 30	Modified fever: symptoms slight.	Tartar emetic.	Prostration; nausea; no vomiting.	3 h. 30 m. after its use.	
Jehan Mohammed. 25.	Quartan, 1st attack.	3. P. M.	4. 30 P. M.	5. P. M.	7. 30 P. M.	8. P. M.	9. P. M.	6.	Acute fever.	Purgatives. tartar emetic.	Prostration; nausea; no vomiting.	6 h.	A rare type of the intermittent fever compared with the others.

Nor do I recommend tartar emetic as an *anti-periodic*. So frequently have I been deceived by the anti-periodic virtues said to exist in a certain class of medicines, that I confess myself a sceptic as to any such qualities being inherent in medicine. Quinine, bark in powder, and bark in decoction, administered in small and large, and frequently repeated doses, have failed to check the onset of the fever, or to modify its symptoms. A single dose of Epsom salts has converted a quotidian into a tertian fever; a tertian into the quartan type. Under such circumstances, to which of these medicines ought we to attribute the virtues of anti-periodicity? But, to the value of tartar emetic as a *remedial agent* in the treatment of intermittent fever, *the results of more than 300 cases discharged cured*, from the Regimental Hospital, 5th Infantry, Gwalior contingent; the results, also, of cases treated under my orders, as Civil Surgeon in charge of the district of Kuchwahargar, in 1847; and at present in charge of the district of Chundeeree, bear sufficient evidence.

The relative value of each medicine, and the relative value of each mode of treatment, in this type of fever, might be tested by the careful record of 100 or 300 cases in a form similar to that annexed. If each practitioner who has devoted his time to the study of the value of a particular medicine, and advocates a particular line of treatment in this disease, would publish the results of his practice in some such form, the profession at large would be enabled to compare the results, and deduce therefrom their own conclusions.*

In these records, all fatal cases, and all unpleasant sequels resulting from the adoption of a particular line of treatment, should be laid before the public. The profession is generally favoured *with the detailed accounts of success in practice*; seldom, however, are the *detailed statements of cases, unsuccessfully treated*, placed before the public, to enable medical men of unbiassed judgment to form an opinion as to the legitimate

* This advice is especially needed at the present moment, when it is so desirable to have a candid record of the results obtained in the treatment of cholera.—Ed. Gaz. (London Medical.)

Form of Register—see opposite page, 104.

pretensions of this medicine or that medicine, or to the merits of this line of treatment, or that line of treatment.

Until this erroneous system of inviting public attention *to success*, and not to *ill success in practice*, be rectified; until a per contra account of fatal cases, arising from the adoption of a favourite mode of treatment, be faithfully and honestly recorded, and trumpeted forth with the same assiduity as those cases successfully treated; it is mere waste of time to endeavour to form data for comparing the relative value of medicines in the treatment of disease.

With a view to elucidate the effects produced by tartar emetic in ague, and the advantages derivable from its use, I propose to group together numerical statements and returns which bear directly on the subject. I would solicit attention more particularly to the returns for the years 1848, 49 and 50.

The Monthly Returns of the sick in hospital of the 5th Infantry Regiment, Gwalior Contingent for the years 1847—1848—1849 *and* 1850, *exhibit the following results.*

1847—*Stationed at Mohonah.*

	Remaining.	Admitted.	Total.	Cured.	Average period under treatment.	Died.	Remaining.
From 1st to 31st January, ...	4	7	11	10	33 days.	0	1
From 1st to 28th February, ...	1	3	4	4	22 do.	0	0
From 1st to 31st March, ...	2	9	9	7	10 do.	0	2
From 1st to 30th April, ...	2	9	11	10	11 do.	0	1
From 1st to 31st May, ...	1	6	7	4	52 do.	0	3
From 1st to 30th June, ...	3	10	13	10	7 do.*	0	3
From 1st to 31st July, ...	3	6	9	8	6 do.	0	1
From 1st to 31st August, ...	1	10	11	3	6 do.	0	8
From 1st to 30th September, ...	8	34	42	25	6 do.	0	17
From 1st to 31st October, ...	17	23	40	39	6 do.	0	1
From 1st to 30th November, ...	1	21	3	3	10 do.	0	0
From 1st to 31st December, ...	0	5	5	3	6 do.	0	2

* The treatment of intermittent fever with graduated doses of tartar-emetic, commenced in this month.

Stationed at Lullutpore, 1848.

	Remaining.	Admitted.	Total.	Cured.	Average period under treatment.	Died.	Remaining.
From 1st to 31st January,	2	3	5	4	11 days.	0	1
From 1st to 29th February,	1	8	9	5	9 do.	0	4
From 1st to 31st March,	4	12	16	13	5 do.	0	3
From 1st to 30th April,	3	7	10	6	5 do.	0	4
From 1st to 31st May,	4	14	18	11	9 do.	0	7
From 1st to 30th June,	7	14	21	17	13 do.	0	4
From 1st to 31st July,	4	31	35	27	6 do.	0	8
From 1st to 31st August,	8	54	62	45	13 do.	0	17
From 1st to 30th September,	17	75	92	57	7 do.	0	35
From 1st to 31st October,	35	33	68	62	11 do.	0	6
From 1st to 30th November,	6	9	15	13	7 do.	0	2
From 1st to 31st December,	2	1	3	3	13 do.	0	0

Stationed at Lullutpore, 1849.

From 1st to 31st January,	0	1	1	1	3 do.	0	0
From 1st to 28th February,	0	0	0	0	0 do.	0	0
From 1st to 31st March,	0	4	4	4	3 do.	0	0
From 1st to 30th April,	0	7	7	4	6 do.	0	3
From 1st to 31st May,	3	9	12	11	6 do.	0	1
From 1st to 30th June,	1	9	10	10	4 do.	0	0
From 1st to 31st July,	0	19	19	19	4 do.	0	0
From 1st to 31st August,	0	35	35	26	5 do.	0	9
From 1st to 30th September,	9	60	69	48	6 do.	0	21
From 1st to 31st October,	21	94	115	105	6 do.	0	10
From 1st to 30th November,	10	37	47	43	6 do.	0	4
From 1st to 31st December,	4	15	19	16	9 do.	0	3

Stationed at Lullutpore, 1850.

From 1st to 31st January,	3	3	6	6	5 do.	0	0
From 1st to 28th February,	0	10	10	7	7 do.	0	3
From 1st to 31st March,	3	11	14	11	7 do.	0	3
From 1st to 30th April,	3	5	8	6	5 do.	0	2
From 1st to 31st May,	2	22	24	20	7 do.	0	4
From 1st to 30th June,	4	12	16	13	6 do.	0	3
From 1st to 31st July,	3	16	19	15	6 do.	0	4
From 1st to 31st August,	4	39	43	33	7 do	0	10
From 1st to 30th September,	10	61	71	48	6 do.	0	23
From 1st to 31st October,	23	86	109	98	6 do.	0	11
From 1st to 30th November,	11	46	57	45	9 do.	0	12
From 1st to 31st December,	12	24	36	32	8 do.	0	4

The preceding analysis of the treatment of intermittent fevers by tartar-emetic is by no means as favourable, as might be made apparent, by separating the quotidian from the tertian type.—The abstract has been drawn up chiefly for the purpose of shewing the number of cases treated in the years 1848—49 and 50, without employing a grain of quinine, bark in powder or bark in decoction, or any preparation of arsenic. The treatment has been restricted for three successive years to the administering of purgatives in the first instance, followed up by the graduated doses of tartar-emetic, for the purpose of testing the efficacy of a particular medicine in particular types of disease.

A fairer estimate of the value of tartar-emetic, may be formed from the following tables which enter more into details. They exhibit results, so far favorable to the plan of treatment pursued, as to entitle it to a fair trial at the hands of others. On economic principles, it contrasts strongly with the use of quinine, a matter of no small importance to Government. The expenditure of quinine in military hospitals, and in civil medical institutions supported by Government, must be considerable; its cost annually forms an important item in the bills of Government. The quantity of tartar-emetic indented for, and expended in the hospitals under my charge, during the last three years, has been 14 ounces. The quantity of quinine indented for, during the same period amounts to 36 ounces—out of which there remained on hand, by weight on the 1st March, 1851, when the last indents were prepared, 16 ounces. The expenditure of this medicine in the treatment of intermittent fevers during the last three years, has been trifling; whilst in all other forms of disease, but chiefly in restoring strength and tone to the system during convalescence after acute remittent or continued fevers, the expenditure has not exceeded 20 ounces.

Within the last few months, I have combined quinine with tartar-emetic and epsom salts in cases of doubtful ague. The quantities employed will be found farther on.

Abstract of Cases of Intermittent Fever, of the quotidian type, treated with purgatives and Tartar-Emetic.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
1	Bhowany Deen.	S.	5	20	1849. 6th Aug.	4 Ague fits, 1st and 2nd slight, 3rd and 4th very severe.	Purgatives followed by tartar-emetin mixture, 1 gr. to 5 oz.	One, symptoms acute, stages well marked.	Quotidian uncomplicated.	7 Doses, 4 discharges from the stomach, 7 from the bowels. Prostration.	11th Augt. on return of the fever, after the first attack.	Cases Nos. 1, 2, 3 & 4. In each case the paroxysm in hospital was ushered in by chills, langour and a crippling coldness of the hands and feet, pain in the head, aching in the back and loins, thighs and calves of the legs, sickness of the stomach and loss of appetite with thirst. The cold stage was attended with loud chattering of the teeth, and shaking of the charpoy. The patient lying huddled up in his cotton quilt. The pulse was *small*, quick, wiry and contracted, the tongue white *and furred.*
2	Gookbul Sing.	S	5	20	6th Aug.	3 Ague fits 1st and 2nd slight, 3rd acute.	Ditto.	Ditto.	Ditto.	10 Doses, 6 discharges from the stomach, 5 from the bowels. Prostration.	9th Augt. ditto.	
3	Chond Khan.	S.	6	25	6th Aug.	3 Ague fits, one daily. 1st and 2nd slight, 3rd attack *acute.*	Ditto.	One, symptoms *acute,* stages well defined.	Ditto.	8 Doses, 7 discharges from the stomach. 6 do. from the bowels.	8th Augt. ditto in hospital.	
4	Ramdheen Sing.	S.	4	30	6th Aug.	2 Ague fits. 1st slight, 2nd severe.	Purgatives followed by tartar-emetic mixture, 1 gr. to 5 oz. of water.	One, symptoms acute, stages marked.	Ditto.	9 Doses, 4 discharges from the stomach. 7 from the bowels.	9th Augt. ditto.	

This stage was followed by intense fever, burning heat of skin, blood-shot eyes, full throbbing pulse, burning in the palms of the hands and soles of the feet; scanty and high coloured urine. These symptoms were succeeded by profuse perspiration, and prostration of strength.

With each discharge from the stomach after the tartar-emetic, a quantity of bile was ejected. Slime *and* bile *also* passed in considerable quantity from the bowels. After these effects from the tartar-emetic, and by continuing the mixture, until the patients had taken from 8 to 10 doses, there was no return of the fever.

Abstract of Cases.—Continued.

No. of Cases.	Names.	Rank.	Company.	Age	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
					1849.							
5	Mootie.	S.	1	25	8th Aug.	5 Ague fits, slight at 1st, 4th and 5th severe.	Purgatives followed by tartar-emetic mixture, 1 gr. to 5 oz. of water.	One acute attack, the cold stage unusually prolonged.	Quotidian uncomplicated.	7 Doses, administered previous to, during, and after the attack, 5 vomitings, 7 purges.	13th Augt. After extreme prostration, no return of the fever.	
6	Kadar Bux.	S.	1	30	8th Aug	2 Ague fits. each attended with acute symptoms.	Ditto.	Two, the 1st acute, 2nd mild; paroxysm arrested in hot stage.	Ditto.	14 Doses, 6 discharges from the stomach and 5 from the bowels.	13th Augt. After the 2nd ague fit in hospital, no return of fever.	A quantity of bile discharged from the stomach and bowels.
7	Seuraj Tewerry.	S.	2	30	11th Aug.	3 Ague fits, 1st slight, 2nd and 3rd attended with acute symptoms.	Ditto.	One acute attack, cold stage prolonged.	Quotidian.	8 Doses, 5 vomitings, 7 purges. Prostration.	15th Augt. After extreme prostration, no return of the fever.	Ditto.

8	Ukbbur Khan.	S.	3	30	11th Aug.	4 Ague fits, one daily, 3rd and 4th attacks attended with acute symptoms.	Ditto.	Two attacks, 1st severe, 2nd mild. Paroxysm arrested in cold stage.	Quotidian uncomplicated.	12 Doses, 7 vomitings, 5 purges. Prostration.	17th Augt. After the 2nd attack in hospital. no return of fever.	Viscid mucus mixed with bile ejected from the stomach in considerable quantities.
9	Rampersaud.	S.	Gr.	30	13th Aug.	3 Ague fits, one daily, 2 slight, 3rd severe.	Ditto.	One acute attack.	Ditto.	7 Doses, 7 vomitings, 6 purges. Prostration,	17th Augt. No return after the attack in hospital.	
10	Hursookh.	S.	5	20	17th Aug.	2 Ague fits, acute.	Ditto.	One acute attack, each stage well marked.	Ditto	8 Doses, vomiting and purging with prostration.	21st Augt No return after the effects of the tartar-emetic.	Ditto.
11	Jalish Ram.	S.	6	30	Ditto.	5 Ague fits, one daily, unable to appear at parade after the 4th.	Ditto.	One acute attack, the day after admission.	Ditto.	9 Doses, 4 vomitings, 6 purges. Extreme prostration.	21st Augt. No return after the attack in hospital.	Bile in profuse quantity discharged from the stomach and bowels.
12	Doorga Doobey	S.	6	30	18th Aug.	2 Ague fits, one daily, incapacitated for duty by the 2nd.	Ditto.	Ditto.	Ditto.	7 Doses, 5 discharges from the stomach, 6 from the bowels. Prostration.	22nd Augt. A second attack did not develop itself.	Ditto.

Abstract of Cases.—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission into hospital,	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
					1849.							
13	Parman Sook.	S	Gr.	25	18th Aug.	3 Ague fits, incapacitated for duty by the 3rd.	Purgatives on admission followed by tartar-emetic mixture, 1 gr. to 5 oz. of water.	One severe attack, cold stage prolonged, hot stage marked by intense fever.	Quotidian uncomplicated.	8 Doses, 7 vomitings. 6 purges. Extreme prostration after the mixture.	23rd Augt. No return after the attack in hospital.	Symptoms same as in Cases, Nos. 1, 2 and 3, bile and mucus passed in considerable quantities from the bowels and stomach.
14	Hitlall.	H.	Gr.	30	24th Aug.	2 Ague fits, 1st slight, 2nd acute.	Ditto.	Two acute attacks, each stage strongly marked.	Ditto.	12 Doses, 5 vomitings, 7 purges. Prostration after each dose.	28th Augt. No return after the 2nd attack.	Ditto.
15	Jowarhir Sing.	S.	6	30	Ditto.	3 Ague fits, one every day, after the 3rd, unfit for duty.	Ditto.	One, strongly marked in all its stages.	Ditto.	7 Doses, 4 discharges from the stomach, 5 from the bowels.	29th Augt. No return after the attack in hospital.	Ditto.
16	Bhowany.	S.	5	30	Ditto.	2 Ague fits, one daily.	Ditto.	Two strongly marked attacks, one daily, each stage acute.	Ditto.	13 Doses, 5 vomitings. 6 purges. Prostration slight.	30th Augt. No return after the 2nd attack.	Ditto.

17	Sahib Sing.	S.	2	30	25th Aug.	4 Ague fits, one daily, after the 3rd unfit for duty.	Ditto.	One attack acute in all its stages.	Ditto.	7 Doses, attended by 5 discharges from the stomach, 8 from the bowels.	29th Augt. No return after the attack in hospital.	Ditto.
18	Buldeo.	S.	4	30	26th Aug.	2 Ague fits, one daily, unfit for duty after 2nd.	Ditto.	Two acute attacks, each stage strongly marked.	Ditto.	14 Doses, 4 vomitings, 7 purges. Prostration slight after the mixture.	3rd Sept. No return after the 2nd attack.	Ditto.
19	Teeka-ram.	S.	Lt.	20	Ditto.	4 Ague fits, one daily, slight at first unfit for duty after 3rd.	Ditto.	Two prolonged attacks, one daily, symptoms in each stage acute, 2nd paroxysm arrested.	Ditto.	15 Doses, 5 discharges from the stomach, 8 from bowels. Prostration marked.	Ditto.	Ditto.
20	Bhodoo Khan.	S.	2	30	30th Aug.	2 Ague fits, one daily, unfit for duty after 2nd.	Ditto.	One, strongly marked attack.	Ditto.	7 Doses, 3 vomitings, 3 purges. Extreme prostration after each dose.	Ditto in hospital.	Ditto.
21	Rampursaud.	S.	5	30	3rd Sep.	1 Ditto, unfit for duty after 3rd.	Ditto.	Two acute attacks, in which the stages were strongly marked.	Ditto.	12 Doses, 5 discharges from the stomach, 7 from the bowels. Prostration.	8th Sept. No return of the fever after the 2nd paroxysm.	Ditto.

Abstract of Cases—Continued.

No. of Cases	Names.	Rank.	Company.	Age.	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
22	Ramzuhal.	S.	5	25	1849. 3rd Sep.	3 Ague fits, one daily, unfit for duty after 2nd	Purgative on admission followed by tartar-emetic mixture. ½ gr. to 5 oz. of water.	One strongly marked paroxysm, symptoms acute and distressing.	Quotidian uncomplicated.	6 Doses, 4 vomitings, 6 purges. Extreme prostration.	6th Sept. No return of the fever.	Symptoms same as in Cases Nos. 1, 2 and 3, bile and mucus passed in considerable quantities from the bowels and stomach.
23	Lookha.	S.	Gr.	30	Ditto.	9 Ague fits, one daily.	Ditto.	One strongly marked paroxysm, symptoms acute.	Ditto.	8 Doses, producing 5 discharges from the stomach, 4 from the bowels.	8th Sept. No return after the attack in hospital.	Ditto.
24	Sahib Sing.	S.	Lt.	25	Ditto.	4 Ditto.	Ditto.	Two attacks, in which the symptoms were acute.	Ditto.	14 Doses, producing 6 vomitings, 6 purges.	10th Sept. No return of the fever, after the 2nd paroxysm.	Ditto.
25	Ramchurn.	S.	Lt.	20	Ditto.	3 Ditto.	Ditto.	Two attacks, one daily, symptoms strongly marked.	Ditto.	13 Doses, producing 4 vomitings, 5 purges. Slight prostration.	Ditto.	Ditto.

26	Sahadhan.	S.	Gr.	30	Ditto.	3 Ague fits, one daily, 1st two slight, 3rd severe.	Ditto.	One attack, paroxysm acute.	Ditto.	9 Doses, producing 6 vomitings 6 purges.	8th Sept. No return of the fever.	Ditto.	
27	Bood Sing.	S.	1	20	7th Sep.	3 Ague fits, one daily, unfit for duty after 3rd attack.	Ditto.	Two attacks, one daily, symptoms acute.	Ditto.	15 Doses, 4 vomitings, 5 purges. Slight prostration.	13th Sept. No return of the fever, after the 2nd paroxysm.	Ditto.	
28	Nundhen Sing.	S.	1	25	Ditto.	3 Ague fits, one daily, after 3rd unfit for duty.	Ditto.	Two attacks, one daily.	Ditto.	13 Doses, producing 5 vomitings, 7 purges.	13th Sept. No return after 2nd paroxysm.	Ditto.	
29	Golaub Sing.	S.	1	30	15th Sep.	2 Agus fits, both severe.	Ditto.	One acute attack.	Ditto.	7 Doses, 4 vomitings, 5 purges.	20th Sept. No return after the attack in hospital.	Ditto.	
30	Elahi Bux.	S.	2	40	Ditto.	3 Ague fits, one daily, unfit for duty after 3rd attack.	Ditto.	Ditto.	Ditto.	8 Doses, producing 5 vomitings, 3 purges.	Ditto.	Ditto.	
31	Sewbuccus.	S.	Gr.	25	23rd Sep.	3 Agus fits, one daily.	Ditto.	Two severe attacks.	Ditto.	14 Doses, producing 6 discharges from the stomach and 5 from the bowels.	29th Sept. No return after the 2nd attack.	Ditto.	

Abstract of Cases—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharges from the hospital.	Remarks.
32	Jowarhip Sing.	S.	5	30	1849. 24th Sep.	3 Ague fits, one daily, unfit for duty after 3rd.	Purgatives on admission followed by tartar-emetic mixture, 1 gr. to 5 oz. of water.	Two severe paroxysms.	Quotidian uncomplicated.	12 Doses, 4 vomitings, 5 purges.	29th Sept. No return after 2nd.	Symptoms same as in Cases Nos. 1, 2 and 3, bile and mucus passed in considerable quantities from the bowels and stomach.
33	Essore Dohey.	N	Gr.	35	27th Sep.	Ditto.	Ditto.	One acute paroxysm.	Ditto.	7 Doses, 4 vomitings, 4 purges.	29th Sept. No return.	Ditto.
34	Dubee Sing.	S.	Gr.	30	2nd Oct.	3 Ague fits, one daily, after 3rd unfit for duty.	Ditto.	One acute attack.	Ditto.	7 Doses, producing 5 discharges from the stomach, 5 from the bowels.	5th Oct. No return after the paroxysm in hospital.	Ditto.
35	Sunkur Tewarry.	S.	3	30	Ditto.	5 Ague fits, one daily, slight at first, 4 and 5 severe.	Ditto.	Two attacks, one daily.	Ditto.	12 Doses, 5 vomitings and 5 purges.	9th Oct. No return after 2nd attack.	Ditto.

36	Gobabur Sing.	S.	2	25	Ditto.	3 Ague fits, one daily.	Ditto.	Two attacks, one daily. Paroxysms severe.	Ditto.	12 Doses, 6 vomitings, 4 purges.	9th Oct. No return after 2nd attack.	Ditto.
37	Jubbur Sing.	S.	Gr.	20	3rd Oct.	5 Ague fits, one daily, slight at first, 4th and 5th severe.	Ditto.	One severe paroxysm.	Ditto.	8 Doses, 4 vomitings, 6 purges. Excessive prostration.	Ditto.	Ditto.
38	Chandee.	S.	Lt.	25	Ditto.	3 Ague fits, one daily.	Ditto.	One severe paroxysm. each stage strongly marked.	Ditto.	6 Doses, 4 vomitings, 1 purges. Excessive prostration.	7th Oct. No return after paroxysm in hospital.	Ditto.
39	Houlass.	S.	5	30	4th Oct.	2 Ague fits, after the 2nd unfit for duty.	Ditto.	Ditto.	Ditto.	10 Doses, producing 6 vomitings, 5 purges and prostration.	7th Oct. No return after the paroxysm.	Ditto.
40	Dindeal Tewarry.	S.	6	20	Ditto.	5 Ague fits, slight at first, 4th and 5th severe.	Ditto.	Two severe paroxysms, one daily.	Ditto.	13 Doses, producing 4 vomitings, 5 purges. Prostration.	10th Oct. No return after 2nd attack.	Ditto.
41	Dharun Sing.	S.	Lt.	20	4th Nov.	3 Ague fits, after 3rd unfit for duty.	Ditto.	One acute paroxysm.	Ditto.	9 Doses, producing 6 vomitings, 7 purges and extreme prostration.	7th Nov. No return after the attack in hospital.	Ditto.

Abstract of Cases—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
					1849.							
42	Seetul.	N.	1	30	11th Nov.	2 Ague fits, after 2nd unfit for duty.	Purgatives on admission followed by tartar-emetic mixture, 1 gr. to 8 oz of water.	Two acute paroxysms, one daily, each stage strongly marked.	Quotidian uncomplicated.	12 Doses, producing 7 vomitings, 7 purges and prostration.	17th Nov. No return after 2nd attack.	Symptoms same as in Cases Nos. 1, 2 and 4, bile and mucus passed in considerable quantities from the bowels and stomach.
43	Lall Sing.	S.	1	25	15th Nov.	3 Ague fits, one daily.	Ditto.	One acute paroxysm.	Ditto.	7 Doses, causing 7 vomitings, 7 purges and extreme prostration.	21st Nov. No return after the attack in hospital.	Ditto.
44	Kowul Sing.	S.	6	25	Ditto.	Ditto.	Ditto.	Ditto.	Ditto.	7 Doses, 8 vomitings, 5 purges and extreme prostration.	21st Nov. No return.	Ditto.
45	Gonnesa.	S.	1	30	Ditto.	3 Ague fits, one daily, after 3rd unfit for duty.	Ditto.	Two severe paroxysms.	Ditto.	16 Doses, 3 vomitings, 4 purges. Prostration.	21st Nov. No return after 2nd attack.	Ditto.

46	Gunga.	S.	5	10	Ditto.	3 Ague fits, one daily, unfit for duty after 3rd.	Ditto.	Two acute paroxysms, each stage strongly marked.	Ditto.	16 Doses, producing 8 discharges from the stomach, 4 from bowels.	21st Nov. No return of the ague after 2nd attack.	Bile and viscid mucus discharged in large quantity from the stomach and bowels.
47	Kamta Persaud.	S.	Lt.	30	Ditto.	4 Ague fits, one daily.	Ditto.	One severe paroxysm.	Ditto.	6 Doses, causing 5 vomitings, 7 purges and extreme prostration.	17th Nov. No return after the paroxysm.	Ditto.
48	Gopal Sing.	N.	3	33	Ditto.	2 Ague fits, unfit for duty after 2nd.	Ditto.	Two acute paroxysms, each stage strongly marked, 2nd arrested in the cold stage.	Ditto.	13 Doses, producing 5 vomitings, 3 purges. Slight prostration.	21st Nov. No return after 2nd paroxysm.	Ditto.
49	Sewah Sing.	S.	5	35	17th Nov.	Ditto.	Ditto.	One acute paroxysm.	Ditto.	6 Doses, 7 vomitings, 5 purges. Prostration.	21st Nov. No return of the ague.	Ditto.
50	Phulnam Sing.	S.	6	30	22d Nov.	4 Ague fits, one daily.	Ditto.	One acute attack.	Ditto.	5 Doses, causing 7 vomitings, 7 purges. Extreme prostration.	27th Nov. No return of the ague.	Ditto.

The record of the foregoing 50 cases, proves in some measure the efficacy of Tartar Emetic in subduing an attack of intermittent fever, and in warding off a return of the paroxysm when prescribed in the intervals between each attack;—or, for a few hours previous to the anticipated period of development. These are selected cases;—selected with a view to ascertain the influence exercised by this medicine over the paroxysms of ague in each of its stages, in that form of the disease called uncomplicated quotidian. There did not occur any delay in prescribing the Tartar Emetic Mixture after the bowels had been cleared out by a brisk purgative. The effects produced by the medicine, were nearly alike in all the cases. Considerable quantities of bile, and of viscid mucus, were ejected from the stomach, and passed downwards through the intestinal canal,—followed by prostration of the muscular system, extreme in some, slight in others,—and with debility of the circulating system in all. If the dates of admission into the regimental hospital be compared with the dates of the discharge of the patients, it will be seen that the generality of the stay in hospital did not average more than 5 or 6 days, at the same time it must be borne in mind that the patients were detained for 2 or 3 days under surveillance to ascertain their perfect freedom from any approach to an aguish paroxysm.

Each case on admission, and during the stay in hospital, was examined to ascertain the state of the abdominal viscera. More particularly in reference to the condition of the spleen. In very few of the patients, could it be said that this organ was affected. Sometimes it felt under the hand slightly enlarged and tumified.

Abstract of Cases of Intermittent Fever, of the tertian type, treated with purgatives and Tartar-Emetic.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission into hospital.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
1	Bhola.	N.	6	30	1819. 1st Aug.	2 Ague fits, at an interval of 3 days, unfit for duty after 2nd paroxysm.	Purgatives an admission followed by tartar-emetic mixture, 1 gr. to 5 oz. of water.	One severe paroxysm, which lasted 8 hours.	Tertian.	7 Doses, viz. 1 on the day of the paroxysm, 3 subsequently : vomiting, purging and prostration.	5th Augt. No return after the attack in hospital.	A quantity of bile discharged from the stomach and bowels.
2	Takoor-deen.	S.	Gr.	30	2nd Aug.	2 Ague fits, at an interval of 2½ days, unfit for duty after 2nd attack.	Ditto.	One severe paroxysm, of 9 hours duration.	Ditto.	9 Doses, producing vomiting, purging and extreme prostration.	6th Augt. Ditto.	Ditto.
3	Shaik Dhaim.	S.	4	30	4th Aug.	3 Ague fits, 1st and 2nd slight, 3rd acute.	Ditto.	Two paroxysms, at an interval of 2½ days.	Ditto.	16 Doses, causing 13 vomitings 10 purges.	10th Augt. No return after 2nd.	Ditto.

Abstract of Cases—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission into hospital.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
4	Deep Sing.	S.	4	30	1849. 7th Aug.	3 attacks, at first of the quotidian type, last fit at an interval of 48 hours.	Purgative on admission followed by tartar-emetic mixture, 1 gr. to 5 oz. of water.	Two paroxysms, at an interval of 56 hours.	Tertian uncomplicated.	15 Doses, vomiting, purging and extreme prostration.	13th Augt. No return after 2nd attack.	A quantity of bile and mucus, discharged from stomach and bowels.
5	Emamm Bux.	S.	2	30	9th Aug.	3 Ague fits.	Ditto.	Three paroxysms, at intervals of 50, 60 and 72 hours.	Ditto.	18 Doses, ditto.	18th Augt. No return after the 3rd paroxysm, which was slight compared with 1st and 2nd.	Ditto.
8	Jowahlr Sing.	S.	5	25	5th Sep.	3 Ague fits, 1st and 2nd daily, 3rd at an interval of 2 days.	Ditto.	One strong paroxysm, which lasted 10 hours.	Ditto.	8 Doses, producing 6 vomitings, 7 purges.	10th Sept. No return after 3rd paroxysm.	Ditto.

7	Makhum Sing.	S.	Gr.	30	10th Sep.	2 Ague fits, at an interval of 50 hours.	Ditto.	Two severe paroxysms, at an interval of 3 days.	Tertian.	16 Doses, producing vomiting, purging. Extreme prostration.	19th Sept. No return after the 2nd attack.	Ditto.
8	Doorga Pursaud.	S.	G	30	14th Sep.	4 Slight ague fits, at irregular intervals.	Ditto.	Four paroxysms, at irregular intervals.	Alternate and Tertian.	22 Doses, 19 vomitings, 13 purges. Prostration.	29th Sept. No return after 4th. Debility considerable.	Recovery tedious.
9	Toolsa-ram.	S.	5	35	17th Sep.	2 Ague fits, at an interval of 60 hours.	Ditto.	One severe paroxysm, of 9 hours duration.	Tertian uncomplicated.	8 Doses, vomiting, purging and prostration.	21st Sept. No return.	A quantity of bile and mucus, discharged from the stomach and bowels.
10	Bustow Sing.	S.	5	30	18th Sep.	Ditto of 24 days.	Ditto.	Two attacks symptoms acute, each stage strongly marked.	Ditto.	14 Doses, producing extreme prostration with vomiting and purging.	25th Sept. No return after 2nd paroxysm, which was suddenly arrested.	Ditto.
11	Sewdeen Oostee.	S.	Lt.	25	21st Sep.	3 Ague fits, at intervals of 18 and 50 hours.	Ditto.	Ditto.	Tertian.	12 Doses, causing 9 vomitings, 10 purges with debility.	29th Sept. Ditto.	Ditto.

R 2

123

Abstract of Cases—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission into hospital.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
					1849.							
12	Boodh Sing.	H.	Gr.	40	24th Sep.	2 Ague fits, at irregular intervals.	Purgatives on admission followed by tartar-emetic mixture, 1 gr. to 5 oz. of water.	Two attacks, 2nd paroxysm arrested.	Tertian uncomplicated.	16 Doses, extreme prostration, vomiting and purging.	3rd Oct. No return after the arrest of the 2nd attack.	A quantity of bile and mucus, discharged from the stomach and bowels.
13	Gongah Bhot.	S.	4	30	28th Sep.	3 Ague fits, at intervals of 2½ days.	Ditto.	Two severe paroxysms.	Ditto.	12 Doses, extreme prostration.	6th Oct. Ditto 2nd paroxysm.	Ditto.
14	Narain Sing.	S.	Gr.	30	Ditto.	3 Ague fits, ditto.	Ditto.	One severe paroxysm, on the 2nd day after admission.	Tertian.	10 Doses, 1st dose given after the paroxysm had set in.	3rd Oct. No return of the ague.	Ditto extreme prostration after each dose of the tartar-emetic.
15	Doolom Doobay.	S.	5	20	30th Sep.	2 Ague fits.	Ditto.	Two attacks, at an interval of 60 hours.	Tertian uncomplicated.	20 Doses, producing vomiting, purging and debility.	9th Oct. No return.	Ditto.

16	Dalcedeen Ooparaea.	S.	4	30	Ditto.	3 Ague fits, 1st and 2nd daily. 3rd nearly 3 days after 2nd.	Ditto.	One acute attack, each stage strongly marked.	Ditto.	8 Doses, 1st dose given as soon as the rigor set in, immediate vomiting.	Ditto.	6th Oct. No return.
17	Mata-deen,	S.	Lt.	23	Ditto.	3 Ague fits, at irregular intervals.	Ditto.	Two attacks, at an interval of 2½ days; 2nd paroxysm arrested in the cold stage.	Ditto.	16 Doses, 8 vomitings, 11 purges. Prostration.	[illegible]th Oct. No return after 2nd.	Ditto.
18	Sumbol Sing.	H.	4	15	2nd Oct.	2 Ague fits, unable to attend parade after 2nd.	Ditto.	Two paroxysms, symptoms acute, 2nd paroxysm arrested in hot stage.	Ditto.	11 Doses, 1st dose given after the shivering of the 1st paroxysm set in.	8th Oct. No return.	Ditto.
19	Parun Souk,	S.	6	45	3rd Oct.	3 Ague fits.	Ditto.	One severe paroxysm.	Ditto.	7 Doses, 1st given after the rigor had set in.	7th Oct. Ditto.	Ditto.
20	Ramhue-cus Sing.	S.	6	30	Ditto.	1 Ague fit, of long duration.	Ditto.	One acute paroxysm, each stage strongly marked.	Ditto.	Ditto.	Ditto.	Ditto.

Abstract of Cases—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission into hospital.	Number of attacks of ague before admission.	Treatment whilst in hospital.	Number of attacks of ague after admission into hospital.	Type of the intermittent fever.	Number of doses of tartar-emetic and effect produced.	Date of discharge from the hospital.	Remarks.
					1849.							
21	Sowdeen Mom.	S.	Lt.	30	4th Oct.	2 Ague fits. 1st of short 2nd of long duration.	Purgatives on admission followed by tartar-emetic mixture, 1 gr. to 5 oz. of water.	Two severe paroxysms, 2nd paroxysm arrested in the cold stage.	Tertian uncomplicated.	17 Doses, producing 11 vomitings, 12 purges. Extreme prostration.	9th Oct. No return.	A quantity of bile and mucus, discharged from the stomach and bowels, extreme prostration efter eech dese of the tartar-emetic.
22	Chundee Misr.	S.	4	25	Ditto.	2 Ague fits.	Ditto.	Ditto.	Ditto.	15 Doses, 1st dose given after the cold stage had set in.	10th Oct. Ditto.	Ditto.
23	Mungul Khan.	S.	4	30	8th Oct.	3 Ague fits, at irregular intervals.	Ditto.	Three attacks, at intervals of 50, 80 and 80 hours.	Ditto.	24 Doses, producing vomiting, purging and debility.	20th Oct. Ditto.	Recovery tedious.
24	Mesr Khan.	DR	4	25	Ditto.	2 Ague fits.	Ditto.	Two severe paroxysms, 2od arrested in cold stage.	Ditto.	13 Doses, 1st given after shivering stage had set in.	14th Oct. No return after 2nd attack.	A quantity of bile, discharged from the stomach and bowels.

25	Shaik Hussain.	S.	4	30	Ditto.	2 Ague fits.	Ditto.	Three attacks, 1st and 2nd severe, 3rd mild.	Ditto.	18 Doses, producing debility with vomiting and purging.	18th Oct. No return.	Ditto.
26	Munsa Sing.	S.	5	30	Ditto.	3 Ague fits, at irregular intervals.	Ditto.	One severe paroxysm.	Ditto.	12 Doses.	14th Oct. Ditto.	Ditto.
27	Ujagar Sing.	S.	4	25	9th Oct.	3 Ague fits, at irregular intervals.	Ditto.	Two attacks, 2nd paroxysm arrested in hot stage.	Ditto.	14 Doses, producing debility with vomiting and purging.	15th Oct. No return after 2nd.	Ditto.
28	Jahangeer Khan.	S.	1	20	11th Oct.	3 Ague fits, at irregular intervals.	Ditto.	Two paroxysms, each stage strongly marked.	Ditto.	20 Doses, causing 13 vomitings, 15 purges. Debility.	18th Oct. No return.	Ditto.
29	Chuttur Sing.	S.	Gr.	25	12th Oct.	Ditto.	Ditto.	Three paroxysms, at intervals of 50, 60 and 80 hours.	Ditto.	18 Doses, 3rd attack very mild.	29th Oct. No return after 2nd.	Ditto.
30	Gunnes Gwaliah.	S.	2	30	Ditto.	2 Ague fits.	Ditto.	Two paroxysms, 2nd arrested.	Ditto.	19 Doses, vomiting, purging, debility.	19th Oct. Ditto 2nd attack.	Ditto.

I do not consider it necessary to enumerate more than thirty cases of the tertian type of intermittent fever, in which the use of tartar-emetic was persevered in with marked benefit to the patients. In many of the cases recorded, the paroxysm of the fever was cut short in the cold stage, when the doses of tartar-emetic were given at short intervals, and the patient's system was brought under its influence, soon after the rigor had set in. Vomiting and purging and extreme prostration of the muscular system, were in general the symptoms produced by the mixture of tartar-emetic—one (1) grain to five (5) ounces of water. Latterly, from the more speedy effects produced, this mixture has been substituted for that containing one (1) grain of tartar-emetic to ten (10) ounces of water. The quantity of bile which has been discharged from the stomach and bowels, after a few doses of the medicine had been administered, frequently induced me to believe that the paroxysms were closely connected with its being pent up in the system. Certainly with the speedy and profuse evacuation of bile and viscid mucus from the system, the periodicity of the paroxysms seemed to be broken, and very frequently, altogether arrested.

From the annexed table of cases, of intermittent fever, complicated with congestion, enlargement or other derangements of the spleen and liver, it will be seen that tartar-emetic combined with other remedial measures has proved efficacious in checking the disease.

Abstract of Cases of Intermittent Fever, complicated with congestion, &c. of the spleen and liver, treated with Tartar-Emetic.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission.	Number of attacks of ague before admission with other symptoms.	Treatment whilst in hospital.	Progress of the case in hospital.	Type of the fever.	Number of doses of tartar-emetic, &c.	Date of discharge from the hospital.	Remarks.
31	Duljeet Sing.	S.	3	30	1819. 25th July.	Several, number not known, generally at an interval of 2½ or 3 days, spleen feels congested and enlarged painful under pressure.	Purgatives and tartar-emetic mixture at first, cupping over the spleen, subsequently spleen mixture.	Acuteness of the fever subdued. The frequency of the returning paroxysms checked.	Tertian complicated with congestion and enlargement of the spleen.	15 Doses of tartar-emetic, 1 gr. to 5 oz. of water, vomiting and purging with prostration.	22nd Augt. The size of the spleen was sensibly reduced.	After the cupping the mixture known as "spleen mixture" was substituted for the tartar-emetic. The T. E. mixture proved beneficial in removing the acute symptoms.
32	Kundi Lall.	S.	5	25	Ditto.	4, at irregular intervals. The spleen feels round, congested and enlarged. The liver also is painful at its edges.	Ditto, cupping, spleen mixture.	Acuteness of the paroxysms removed after the vomiting, purging and prostration caused by the tartar-emetic mixture.	Irregular, sometimes tertian, sometimes alternate, sometimes quotidian complicated.	13 Doses, sufficient to prepare the system for the spleen mixture.	5th Augt. The spleen was reduced to its healthy size before he left the hospital.	The beneficial effects of the tartar emetic were apparent here.

Abstract of Cases—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission.	Number of attacks of ague before admission with other symptoms.	Treatment whilst in hospital.	Progress of the case in hospital.	Type of the fever.	Number of doses of tartar-emetic, &c.	Date of discharge from the hospital.	Remarks.
33	Mungul Khan.	S.	4	30	1850. 2nd Jan.	3 Ague fits, at intervals of 30 and 60 hours.	Purgatives followed by tartar-emetic, cupping over the spleen, spleen-mixture.	Fever complicated with congested and enlarged spleen, removed.	Tertian complicated.	16 Doses, producing 13 vomitings, 12 purges Extreme prostration.	19th Jan.	After the cupping, the size of the spleen was reduced.
34	Rampursaud.	S.	2	28	4th Sep.	4 Ague fits, at irregular intervals. Gums colourless and spongy, tongue white moist and flabby.	Ditto with cupping over the liver and spleen. Subsequently spleen-mixture.	Fever complicated with congestion of the spleen and liver, and enlargement of the spleen. Acuteness of the paroxysms arrested by the tartar-emetic.	Tertian complicated each paroxysm attended with strong shiverings of long duration quick wiry pulse, thirst, high fever.	20 Doses, vomiting and purging with prostration. Size of the spleen soon reduced by the cupping.	24th Sept.	A large quantity of bilo and viscid mucus was discharged from the stomach and bowels. After the effects of the tartar-emetic, the spleen lessened in bulk.

33	Lall Sing.	S.	3	30	15th Sep.	1 Agoe fits, slight at first, 4th severe and protracted. gums pale and spongy, tongue white, moist and flabby. conjunctiva of a dusky yellow.	Ditto with cupping in 3 places over the spleen and liver. calomel and antimonial powder.	Acuteness of the paroxysms subdued. On one occasion the cold stage was cut short suddenly after a full dose of tartar-emetic.	Tertian complicated with congested, painful and enlarged spleen. Liver not quite free from disease.	25 Doses, producing vomiting of bilious stuff from the stomach, purging and prostration.	5th Oct.	After the removal of the acute feverish symptoms the spleen mixture was found beneficial.	
30	Maindeen Sing.	S.	4	25	21st Sep.	3 Ague fits, at irregular intervals. attended with symptoms of congested spleen and liver.	Ditto, followed by cupping over the spleen and liver, and spleen mixture.	Frequent paroxysms of ague, each stage strongly marked: interval between the paroxysms varying from 50 to 80 hours.	Tertian complicated Local congestion removed by the cupping.	23 Doses, producing vomiting, purging and prostration. Acuteness of the fever arrested.	Ditto.	Bile and mucus, discharged in considerable quantity.	

Abstract of Cases—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission.	Number of attacks of ague before admission with other symptoms.	Treatment whilst in hospital.	Progress of the case in hospital.	Type of the fever.	Number of doses of tartar-emetic, &c.	Date of discharge from the hospital.	Remarks.
37	Nahnoo Sing.	H.	3	35	1850. 24th Sep.	Several ague fits, with symptoms of congested spleen and liver.	Purgatives and tartar-emetic mixture at first, followed by cupping over the spleen and liver, spleen mixture.	5 Returns of the ague, each paroxysm strongly marked, interval between each varying in duration 70 to 80 hrs. 4th and 5th attack, mild compared with 1st and 2nd.	Tertian complicated Local congestion removed by the cupping.	21 Doses, of tartar-emetic mixture, after which spleen mixture was substituted.	21st Oct.	Bile and mucus, discharged in considerable quantity.

38	Setul Gwallah.	S.	1	25	12th Oct.	1 Ague fits, at irregular intervals.	Purgative followed by tartar-emetic mixture. 1 gr. to 5 oz. Calomel and emeticised antimonial powder 5 grains of each at bed-time.	1 Severe paroxysms: the 4th attack arrested in the cold stage, after a quantity of bile was ejected from the stomach.	Tertian complicated with congested and enlarged spleen and liver.	17 Doses, reducing the acuteness of the fever. Cupping and spleen mixture completed the cure.	27th Oct.	As in the above cases bile discharged in considerable quantity: marked relief afforded by the cupping and the powders occasionally at night.
39	Mahun Sing.	S.	5	15	27th Nov.	3 Ague fits, before he applied for medical treatment. Gums pale and spongy, tongue white, moist and flabby.	Ditto ditto 5 gr. of each occasionally. Cupping and spleen mixture.	3 Acute paroxysms; the 3rd suddenly checked at the onset. Congestion of the spleen removed.	Ditto with congested and enlarged spleen.	15 Doses, producing 12 vomitings, 13 purges and extreme prostration.	12th Dec.	An immediate change produced in the type of the fever, after the extensive local abstraction of blood from the region of the liver and spleen.
40	Munnah Gwallah.	N.	2	35	9th Dec.	3 Ague fits, with pains in the stomach.	Ditto cupping and spleen mixture.	3 Attacks, at intervals of 2½ days. 3rd paroxysm cut short.	Ditto with congested liver and spleen.	16 Doses, tartar-emetic mixture.	21st Dec.	Acuteness of the fever quickly reduced, after which the spleen mixture was given.

Abstract of Cases—Continued.

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission.	Number of attacks of ague before admission with other symptoms.	Treatment whilst in hospital.	Progress of the case in hospital.	Type of the fever.	Number of doses of tartar-emetic, &c.	Date of discharge from the hospital.	Remarks.
					1850.							
41	Kumode Sing.	S.	6	30	13th Dec.	Several attacks at irregular intervals.	Purgatives followed by tartar-emetic mixture, 1 gr. to 5 oz. Calomel and emeticised antimonial powder, 5 gr. of each occasionally. Cupping and spleen mixture.	7 Attacks, form of the fever ill-defined.	Irregular and ill-defined verging on the continued form.	19 Doses, producing vomiting, purging, prostration.	17th Jan. 1851.	Recovery tedious and protracted from chronic enlargement of the spleen.
42	Shaik Subhan.	S.	5	25	Ditto.	3 Ague fits, at intervals of 56 and 70 hours.	Ditto.	3 Paroxysms of long duration; symptoms acute.	Tertian complicated with slight congestion of the spleen.	15 Doses, attended with marked benefit.	20th Dec. 1850.	A large quantity of bile discharged upwards and downwards, affording relief to the system.

43	Oormed Sing.	S.	6	30	31st Dec.	1 Ague fits, at intervals of 40 and 50 hours.	Ditto. Cupping over the spleen.	3 Paroxysms, 3rd cut short in the cold stage.	Tertian complicated with congestion of the spleen.	11 Doses.	9th Jan. 1851.	Ditto. Congestion of the spleen removed by the cupping and a few doses of calomel with emeticised antimonial powder.	
44	Ramnowaj.	S.	Gr.	29	1851. 3rd Jan.	3 Ague fits.	Ditto.	1 Attacks, 3 acute, 1 mild.	Tertian complicated with congested spleen.	17 Doses, producing vomiting, purging, debility.	17th Jan. 1851.	Ditto.	
45	Hurbhan Sing.	S.	6	29	11th Jan.	1 Ague fits, at short intervals, gums pale and spongy. tongue white, moist and flabby.	Purgatives followed by tartar-emetic mixture. 1 gr. to 5 oz. of water. Cupping.	3 Acute attacks in hospital of the quotidian type.	Quotidian complicated with congestion of the liver and spleen.	20 Doses, producing vomiting, purging and debility.	25th Jan. 1851.	Congestion of the viscera, removed by the cupping, soon after the 3rd attack of ague.	
46	Jowahir Sing.	S.	3	30	13th Jan.	Frequent attacks of ague at irregular intervals. Gums pale and spongy. tongue white and flabby.	Purgatives, &c. Cupping. spleen mixture.	5 Returns of the fever, each stage being strongly marked.	Tertian complicated with congested and deranged spleen.	17 Doses.	4th Feb. 1851.	Recovery tedious.	

No. of Cases.	Names.	Rank.	Company.	Age.	Date of admission.	Number of attacks of ague before admission with other symptoms.	Treatment whilst in hospital.	Progress of the case in hospital.	Type of the fever.	Number of doses of tartar-emetic, &c.	Date of discharge from the hospital.	Remarks.
					1851.							
47	Chermeji Sing.	S.	1	30	17th Jan.	Frequent attacks of ague at irregular intervals. Gums pale and spongy, tongue white and flabby.	Purgatives followed by tartar-emetic mixture, 1 gr. to 5 oz. of water. Cupping, spleen mixture.	3 Acute paroxysms, at intervals of 50, 70, and 80 hrs.	Tertian complicated with congestion of the spleen and liver.	12 Doses, producing 17 vomitings, 16 purges and extreme prostration.	28th Jan. 1851.	After the arrest of the fever, the size of the spleen soon diminished.
48	Gucha.	S.	2	35	20th Jan.	3 Ague fits, gums pale and spongy, tongue white, moist and flabby.	Ditto, cupping over the spleen followed by blistering.	9 Acute paroxysms, the last of which was arrested in the cold stage.	Type varied alternate and tertian.	26 Doses.	19th Feb. 1851.	The acuteness of the fever yielded to the use of the tartar-emetic, although the size of spleen was considerably enlarged.
49	Joodha Sing.	S.	Lt.	20	21st Jan.	4 Ague fits, gums pale and spongy, tongue white, moist and flabby.	Ditto.	2 Acute attacks.	Tertian complicated with slight congestion of the liver and spleen.	17 Doses, causing 13 vomitings, 17 purges. Prostration.	28th Jan. 1851.	Bile and viscid mucus passed upwards and downwards, affording great relief to the system.

30	Mahub Ally.	S.	6	25	21th Jan.	4 Ague fits, at irregular intervals.	Ditto. Cupping over the spleen, with spleen mixture.*	3 Acute attacks, 3rd paroxysm arrested in the cold stage.	Tertian complicated with congestion of the liver and spleen.	13 Doses, producing vomiting, purging, and prostration.	24th Feb. 1851.	Bile ejected from the stomach in considerable quantity. Calomel and emetiesed antimonial powder, given occasionally at night, with the spleen mixture in the day time, removed all trace of local congestion.

* R. Pulv. Jalap. Pulv. Rhei.
Pulv. Columbæ. Pulv. Zingiberis.
Potassæ Supertartratis, ... each ʒi.
Ferri Sulphatis, ... ʒss.
Tincturæ Sennæ, ... ʒiv.
Aquæ Menthæ Sativæ, ... ʒx.
Misce.

or

No. 2 Mixture.

Take of.

Jalap—Rhubarb—Columbo—in powder.
Cream of Tartar—of each one drachm.
Sulphate of Iron one scruple.
Sulphate of Quinine half a drachm.
Croton Oil five drops (5.)
Peppermint Water—20 ounces—Mix.

TWINING.

The acuteness of the paroxysms was clearly subdued in every one of the cases in the foregoing list. Not unfrequently, has the fever verged on the continued type, but even then, the administration of the Tartar Emetic has effected a beneficial change in the state of the patient, and has prepared his system for the reception of medicines, prescribed for the deranged condition of the spleen and liver. In the removal of these local congestions, whether they exist in the spleen, or partially in the liver, or in the interior of the gastro-intestinal canal, the abstraction of blood from the part by cupping has answered every purpose. In the course of three or four days after the cupping I have noted a change in the size of the spleen, and in the tumefied and rounded feeling of the edges of the liver at a time when no other medicine was taken by the patient, besides the Tartar Emetic mixture. Between the use of cupping and the use of leeches, in the removal of local congestions, it is scarcely fair to institute a comparison, so much superior is the cupping instrument to the leech.

I have lately combined quinine, and epsom salts with Tartar Emetic, in the treatment of those cases where the type of the fever was ill defined, and where the paroxysms set in with irregularity. Ten grains of sulphate of quinine, 5 drachms of epsom salts and one (1) grain of Tartar Emetic have been combined and an ounce prescribed every hour. When it is desirable to prescribe Quinine and Tartar Emetic in larger quantities, I have generally ordered a mixture of

Sulphate of Quinine,.....	20 grains,
Dilute Sulphuric Acid—sufficient to dissolve,	
Epsom Salts,.....	5 drachms,
Tartar Emetic, ...	2 grains,
Water, ...	10 ounces—mix.

One ounce to be given every hour, or every second hour should vomiting ensue. In the remittent type of fever, I have found this mixture useful, where the symptoms contra-indicated the employment of quinine by itself. With this exception, the recoveries from the paroxysms of intermittent fever have

been effected chiefly, if not solely, through the instrumentality of Tartar Emetic.

It may not be out of place here, to quote from the Annual Report for 1850, on the state of the healthiness of the station, those paragraphs which relate to intermittent fever.

"From the figures entered in this Report for 1850, it will be seen, that the intermittent type of fever has prevailed to a considerable extent in the Regiment. The character of the fever compared with that which prevailed in the Regiment during the preceding years, 1848-49, may be said to be milder, and to have lost much of the protracted severity which marked the paroxysms of the fever in 1849.

"This change in the type of the fever, may in a great measure be attributed to the thorough drainage of the Somera Jheel or tank, lying to the southward of the Sepoys' lines, and to the south-west of the town of Lullutpore.

"In my report forwarded in June, 1849, I noticed the severe and protracted character of the intermittent fever, from which the Sepoys suffered in 1848, and also the frequent complication of enlargement of the spleen, not only in the intermittent type, but also in the remittent. The paragraphs to which I allude, may be quoted here.

"During the months of August, September and October, 1848, sickness prevailed to a considerable extent. The returns of the sick in hospital, forwarded monthly to the Superintending Surgeon, Scindia's Contingent—prove that the corps was more unhealthy at Lullutpore during August, September and October, 1848, than at Mohonah and Poorsah, during the corresponding months of the year 1847.

"The remittent and intermittent types of fever, were complicated in a number of cases with enlargement of the spleen. A circumstance of rare occurrence in the cases of fever, treated at Mohonah.

"With the drainage of so large a body of water as that contained in the Somera Jheel (tank), an extensive surface of mud and puddle, and swampy soil was exposed to the heat of the sun, during the hottest months of the year. The bed of the

tank was thus converted in the first instance into a fruitful source for generating malaria. The stench, and the noxious vapours exhaled from this hot-bed of pestilence, for several months after the Jheel was drained, contributed in no small degree to the sickness prevalent in the corps and to the general insalubrity of the station.

"The causes which gave rise to the then prevailing unhealthiness of the corps, have been removed, and in consequence of the measures adopted to prevent the lodgment of water in any part of the tank by main drains and cross drains, a marked improvement has taken place in the health of the corps, and in the salubrity of the station.

"But the improvement has not been confined to a change in the type of the intermittent fever, from severe to mild, and from complicated to uncomplicated. It has extended to a class of troublesome diseases: viz. Bowel Complaints.

"In the monthly returns, there have been recorded only 21 cases of dysentery and diarrhœa. This exemption from bowel complaints, I am inclined to attribute to the change which has taken place in the quality of the water in the wells, in and about cantonments.

"After the drainage of the Somera Jheel, the supply of water in the wells decreased in a remarkable manner. Many of the wells in the town of Lullutpore, and in cantonments, which were dependent on the leakage from the tank for their supply of water went dry, whilst in almost all, the quantity of water was diminished.

"In quality, however, the water in the wells was improved, in consequence of the supply being derived from springs at a depth, and from the stream which runs close under the Sepoys' lines, instead of being derived by filtration from the Somera Jheel, through the superficial strata of soil, impregnated with salts of an impure and purgative character.

"Of this improvement in the quality of the water for drink, the Native Officers and Sepoys of the Regiment, were fully convinced. Better judges as to the good or bad qualities of drinking water, there could not be."

ART. III.—NOTES ON ACUTE INFLAMMATION OF THE STOMACH AND BOWELS PRODUCED BY THE INTERMIXTURE OF VERDIGRIS WITH THE FOOD. HINTS AS TO THE MANAGEMENT OF INDIAN LABOURERS EMIGRATING TO MAURITIUS AND THE WEST INDIES.

Hints on the management of Indian emigrants.—The form of disease which prevailed amongst the Indian labourers returning from British Guiana to Calcutta, at the expiration of their contracts of service, may be described as acute inflammation of the mucous membrane of the stomach and alimentary canal. This inflammation, in its symptoms, course, and termination, presented many of the characteristic features of acute idiopathic dysentery.

Origin of the disease on board.—The cause of the outbreak of this particular form of disease at the commencement of the voyage, was attributed by me to change of diet, to change of climate, and to the noxious qualities of the Creek water, the vegetable and animal properties of which were at this time undergoing the process of putrefaction.

Although every precaution was taken to counteract the ill effects supposed to have originated in these causes, yet the complaint seemed to increase rather than to diminish. For several successive days, numerous cases, suffering from the same type of disease, were brought aft for my inspection, by the head-men of these Indian labourers.

Perplexed as to the real cause of the disease so rife on board, I was descending the middle hatchway ladder to pay the morning visit to the patients in the hospital part of the ship, when I was stopped by two or three coolies carrying plates loaded with cold rice, and a quantity of rancid ghee. In reply to my question, by what means they had obtained this cold rice it was stated that this food had been cooked one or two days previously. When cooked, the rice and ghee mixed together had been laid aside as a reserve store, to eat in the middle of the night or early in the morning, before the daily rations were served out. As soon as this food was thrown overboard by my orders, I examined the copper plates upon which it had been

kept, and found the surface coated over with a green incrustation,—evidently one of the salts of copper. Thus to neglect, and to slovenliness in not cleaning their copper and brass utensils, and to the intermixture of the salts of copper with their food, was distinctly traced the immediate cause of the disease.

If not seen on the surface, we seldom failed to detect, under the rims of their lotahs and thalies, this incrustation of verdigris, in quantity sufficient to be scraped off with the edge of a penknife. By the application of tests, the incrustations were proved to be the sulphates and muriates of copper.

These salts of copper intermixing with their rice, fish, ghee, and pea soup, produced, in the greater number of cases, a train of symptoms almost similar. At the time of their occurrence on board, the particular symptoms of each case were entered in a medical register. A summary of these symptoms is contained in the following extract from the register :—

Symptoms.—In the evening, or on the following morning, as the case might be, a few hours after having eaten a meal of rice and dholl, those who suffered from its effects were carried to the cabin door, complaining of violent pains and cramps in the stomach and bowels. With these cramps there was a constant vomiting of greenish and yellowish green bile. After the discharge of the contents of the stomach, and these small quantities of bile, dry retching commenced. With ineffectual attempts at vomiting, they suffered from a distressing feeling of constriction in the course of the œsophagus, and across the chest, in the direction of the diaphragm. The calls to evacuate the bowels were frequent. Every half hour, or even less, sometimes in the course of twenty minutes, they were forced to go to the ship's chains; but seldom, in the attempt to relieve the bowels, was feculent matter discharged. Blood in small quantities, and slimy mucous stools tinged with blood, were passed from the rectum. Shreds of lymph and frothy ashen-coloured secretions were forced from the bowels by dint of straining. Without affording relief in a single case, these discharges from the bowels aggravated the sufferings of the patients.

In the loins and sacrum, at the navel and the iliac region, acute lancinating pains have been complained of in each case. With these pains tenesmus, and a burning sensation felt within the rectum, and close to the sphincter ani, were present in all, and were described by the patients to be severe. Pressure made with the palm of the hand over the different parts of the abdomen, in the epigastric region and over the transit of the arch of the colon, in general caused a pungent pain.

The symptoms of acute fever set in immediately after the vomiting and griping pains in the stomach. The patients suffered from headache, urgent thirst, loss of appetite, prostration of strength. The pulse varied from 120 to 140 beats a minute; was small and wiry. The heat of skin was pungent. The tongue was furred and clammy. They complained of a foul, nauseous, bitter taste in the mouth. The conjunctiva of the eyes was bloodshot.

In three cases the quantity of verdigris mixed with the food, and taken into the stomach, must have exceeded that swallowed by the others. The form of attack was more acute. The symptoms and progress of the inflammatory condition of the stomach were more formidable. The depression of the vital powers was more strongly marked. The features of the patient became distorted. His whole frame seemed to writhe under the pain. The pulse was quick, and at the same time so small and weak and thready as scarcely to be felt. The skin became cold; the extremities benumbed; the urine suppressed altogether, or retained in the bladder: when drawn off by the catheter it was high-coloured and tinged with blood. One of these cases terminated fatally shortly after the introduction of the poison into the stomach. The second lingered for a few weeks, and died ultimately of chronic ulceration of the mucous membrane of the intestines. The third recovered in part from the effects of the poison, but suffered from extreme debility of constitution afterwards.

Treatment.—The treatment which proved efficacious in arresting the progress of these symptoms consisted in administering immediately an emetic of twenty grains of ipecacuanha,

with one grain of tartar emetic; after which the patient was ordered to drink barley water, and conjee or rice water, in large quantities. There was not a stomach-pump on board, otherwise the contents of the stomach would have been got rid of by its use instead of trusting to the effects of emetics. In six or eight hours after drenching the stomach with mucilaginous dilnents, twelve or fifteen ounces of blood were taken away by venesection. The quantity of blood was regulated by the strength of the patient and the state of his pulse. In the evening another emetic, of ipecacnanha alone, was given, and when practicable the patient was put in a tub of warm salt water. On the following day, if an impression had not been made on the acuteness of the symptoms, twelve ounces of blood were abstracted from the epigastric and infra-umbilical regions by means of cupping. Flannels wrung out of boiling water were applied for several hours to the surface of the abdomen; and calomel combined with purgatives, was given to clear away the contents of the bowels; after which castor-oil, with laudanum, proved more valuable than other purgatives of a drastic nature in relieving the tenesmus and griping pains in the abdomen.

With few exceptions, the violent character of the symptoms originally complained of, was subdued by this method of treatment. The acuteness of the fever produced by the irritation and inflammation of the mucous membrane of the stomach and bowels was cut short at once. The pulse became fuller, less wiry, less frequent. The griping, lancinating pains in the abdomen were partially, and in a few instances completely, removed. The incessant discharges of slimy, bloody mucus from the intestinal canal; and of frothy, ashen-coloured secretions from the colon and rectum intestines, were checked or diminished in frequency. In this, the first or acute stage of the disease, the treatment adopted proved so far successful that the patient's convalescence was established on the eighth or tenth day. This result was noticed in ten cases. But in four cases, the recovery was more protracted. A sub-acute form of inflammation of the mucous membrane, attended by mucous

discharges from the intestinal canal, eight or ten in number during the twenty-four hours, kept the patient's constitution in a state of low, irritative, feverish excitement. In the neighbourhood of the cæcum, caput coli, and in the direction of the arch of the colon, pressure with the hand produced pain and tenderness. In two cases the disease ultimately assumed all the features of chronic ulceration of the large intestines.

To combat the symptoms which had arisen from the subacute form of inflammation of the mucous membrane, the cupping was repeated from time to time over those parts of the abdomen where the greatest amount of pain or tenderness on pressure was seated. After the cupping, small mustard cataplasms or blisters were applied. The cuts in the skin were carefully protected. Opium in powder by itself, or opium in powder combined with ipecacuanha and blue pill, afforded relief. The diet in each case was restricted to arrow-root, of which there was an abundance on board. Rice, dholl, ghee, salt fish, articles of daily food, were prohibited; and when the debilitated state of the patient called for additional support, port-wine, mixed with arrow-root, was given.

Fatal case of Poisoning by the intermixture of Verdigris with the food.

On the 28th of June, 1843, when we crossed the equator in west longitude 23° 45′ seven weeks' sail by the day from Georgetown, Demarara, the native head-man ran to the cabin to inform me that one of the stoutest coolies on board had been seized with violent cramps in the stomach, with cramps in the limbs, with frequent vomiting, and with purging of slime and blood. He was writhing in pain. In the course of the day he had been observed to be slightly ill, and had been heard to complain of gnawing pains in the stomach; but the circumstances were not reported until the frequency of the purging alarmed those who were represented to be his relations.

His sufferings from pains in the stomach, in the intestines, and in the lower half of the rectum, were severe at the time he was seen by me. His features were distorted. The pulse

was small, quick, and wiry. He complained of urgent thirst, increased rather than slaked by drinking water; and also of a dry and parched feeling at the roof and back part of the mouth. Constriction of the throat, and tightness across the chest in the direction of the diaphragm, were prominent symptoms.

Judging from the suddenness of the attack, from the general features of the disease, and from a corresponding train of symptoms observed in parallel cases but a short time previously, I did not hesitate to express an opinion as to the cause of the man's illness to my friend, the commander of the vessel. He coincided in my views. We immediately examined his brass and copper utensils: on the internal surface of these there remained a coating of verdigris, sufficient in quantity to convince us that this salt of copper got intermixed with his food, and was the immediate cause of his sudden illness. Of this salt of copper remaining on the plate from which his food had been eaten, there was more than sufficient to produce a similar train of symptoms in other cases, had such been mixed with their food.

The treatment successful in former cases was pursued here, but without the same satisfactory results. The relief afforded was temporary. The case terminated fatally.

Extensive and deep-seated inflammation of the mucous membrane, and of the subjacent tissues, was found on the internal surface of the stomach. This inflammatory condition of mucous and submucous tissues extended from the cardiac orifice to the pylorus, and for the distance of an inch and a half on the internal surface of the œsophagus, close to its termination in the stomach. The shades of red varied in different parts from a bright vermilion or bright scarlet, to a deep red or violet colour. The patches of dark red, approaching to a brownish tinge, were small, circular, circumscribed, and situated in general beneath the mucous membrane of the posterior wall of the stomach. The mucous membrane corresponding to these patches was soft, tumid, pulpy, but not excoriated. The surface of the membrane was free from the

appearance of having sloughed. At the pylorus the membrane was intensely inflamed and glistening: tumid, from a quantity of serous fluid exuded beneath the sub-mucous cellular tissue.

In the duodenum the appearances were those of intense redness, a state of excessive injection, and congestion of the tissues by a sero-sanguineous fluid. This infiltration did not extend beyond the transverse portion of the intestine. In the mucous membrane of the small intestines, circumscribed patches of redness were found scattered irregularly over its surface. The mucous membrane of the large intestine presented a few of these circumscribed patches of vascularity. In the rectum the inflammatory action had commenced, but was limited in extent.

Within the peritoneal sac somewhat more than eight ounces of saffron-coloured fluid were found. The peritoneal coat of the jejunum and ileum intestines was numerously studded with minute circular dots or specks of a bright red colour. On the upper surface of the arch of the colon, and on its ascending and descending divisions, these crimson-red circular spots were numerous. Between the peritoneal and muscular coats of the stomach an irregularly shaped patch of effused blood was noticed. On the lateral and inferior surfaces of this same viscus, vascularity of the peritoneal coat, with sub-peritoneal exudations of blood and lymph, was traced to a short distance. The folds of the peritoneum were not agglutinated together by lymph,—lymph was not found in the peritoneal sac.

We need not stronger proofs of the poisonous effects produced by the intermixture of verdigris with the food, than the details recorded in the preceding case. The symptoms indicated poisoning. The inspection of the copper plates from which the food had been eaten confirmed the opinion expressed. The post-mortem examination cleared away all doubts upon the subject.

Hints to Cooley emigrant agents and families in India.—The strictest vigilance on our part was thus eluded by this man. He forfeited his life by disobeying orders. To prevent a recurrence of similar cases, plates, bowls, and wooden platters,

as many as could be collected in the ship, were substituted for these copper and brass dishes. The supply of copper and brass utensils to Cooley emigrants is objectionable. The coolies neglect to clean them for several days successively. Fresh water cannot be supplied by the ships for this purpose. Salt water is reluctantly used: it does not clean the plate according to the ideas of a native. The muriatic acid contained in the salt water, acts upon the copper, and instead of brightening the surface, the more it is scrubbed in with sand and ashes the duller the copper becomes. If allowed to remain for any length of time on the plate or in the vessel, an incrustation of the muriate of copper forms. This salt of copper is as poisonous in its effects as verdigris; but the main objection is, the difficulty of preventing the coolies stowing away by stealth the food which remains in excess:—rice, ghee, salt-fish, pea-soup, and other articles, are heaped in a mess on the same copper plate, and concealed by them for two or three days. During this time the acids contained in the food act upon the copper; verdigris is formed. With the consumption of food, it were strange indeed if some portion of this salt of copper did not get mixed up with it, and thus find its way into the stomach. The effects produced on the stomach and bowels by the eating of a cold mess of this description, were sometimes so serious as to call for active treatment. If to these be added the consequences arising from the intermixture of a salt of copper, however small in quantity, we need not waste words in directing attention to the risk incurred in permitting copper utensils to be used on board ship. For these reasons I have suggested on more than one occasion that the individuals connected with the emigration of coolies from Calcutta and Madras should discontinue the supply of brass lotahs and copper thalies, and should issue in their stead utensils made of tin, of wood, or of delft. If the supply of these articles be one of the items entered in the contracts with the coolies, I am inclined to believe no objection would be raised by them to receive in hard cash a sum of money equivalent to the value of these brass and copper utensils.

In England, cases of poisoning by the intermixture of verdigris with the food do not frequently come under observation. The servants are careful, cleanly, and, in general, particular in using copper utensils. Such is not the case in India. In Calcutta in particular, and in the N. W. Provinces, I have met with cases amongst Europeans, which bore so striking a similarity in the symptoms to those already mentioned, that little doubt has remained on my mind as to the attack having originated in the intermixture of verdigris with their food, through the carelessness of their servants.

In India, haboorchees, khansamahs, khidmutgars, and musalchees, to whom almost every thing connected with the kitchen is entrusted, are not at all times particular in cooking meals for their European masters in bright unstained copper vessels. They are not always particular in having the kitchen utensils well and properly kulai'd. Were more attention paid by European residents in India to the carelessness of their servants in this respect, and were the cooking utensils more frequently inspected by some trustworthy servant in the establishment, we should not hear of so many instances of two, three, or more members of the same family being attacked on the same evening, or in the same night, with symptoms closely allied to those of cholera, or of acute dysentery.

By adopting a system of precaution against such occurrences, a fewer number of families would be placed in mourning from some one member having fallen a victim to the poisonous effects of the salts of copper produced by intermixture with their food.

Pathological appearances in a case of poisoning by Corrosive Sublimate.

The fatal case of poisoning first recorded, reminds me of the case of a non-commissioned Officer who swallowed a quantity of corrosive sublimate to put an end to his existence. The particulars may be here stated.

Poisoning by Corrosive Sublimate, 13th August, 1841.

Sergt. Thomas Todd, H. M.'s 30th Regt. of Foot, was admitted into the General Hospital, Phœnix Park, on Friday the

13th inst., about 12 o'clock, having been conveyed to the hospital by a police man. It was reported, and afterwards confirmed by himself that he had taken corrosive sublimate with the intention to commit self-destruction. From his inability to articulate; his extreme exhaustion; and the agonizing pain he was suffering, no distinct cause for the premeditated suicidal act could be ascertained, nor could the precise period at which the poison was obtained and swallowed, be discovered. After repeated attempts to discharge the contents of the stomach, and introdnce into it the albumen or white of eggs; subcarbonate of soda, &c. by means of the stomach-pump; and the injection of large quantities of these antidotes with opium by the rectum, he died at ¼ before 8 o'clock P. M. about three hours after admission. His senses remained perfect throughout, and though unable to answer, yet wrote on a slip of paper the name of the poison he had taken.

The posterior third, or root of the tongue, seemed to be the commencement or "point de depart" of the pathological changes produced by the poison. The tongue itself appeared enlarged and flabby, coated with mucus—the mucous membrane at the root was abraded, the papillæ circumvallatæ and fungiformes, swollen, full, prominent, and œdematous-looking. The aperture in each was distinct, and patulous, either circular or oval (exuding on pressure, a viscid fluid). The epiglottis remained erect, and rigid, having lost its leaf-like shape; on its lingual aspect it was in part denuded of its mucous membrane, and had passed from a pale white to a deep purple or blackish colour, and afforded quite the appearance of being charred. The muscular fibres underneath, and the fræna epiglottidis were attacked in the same manner, a portion of the mucous membrane remained in front, still covering the sacculi on either side of the frœnum. The posterior aspect was of an ashen grey, the mucous membrane had not suffered in the same degree, was slightly corrugated, and with the glands situated beneath the epithelium, was more conspicuous than usual. The pharynx and æsophagus including its thoracic and cervical divisions, presented an intensely inflamed surface, which

from the deep colour it possessed was compared to animal substances steeped in port-wine. In many parts, the œsophageal structures had changed to a dark green, or gangrenous hue: the mucous membrane could be peeled off with the greatest facility, leaving the muscular coat exposed, the fibres of which had suffered considerably, possessing neither the strength nor tonicity observable in a healthy œsophagus: in several places it was reducible to a soft mass by pressure. Amongst the longitudinal and circular fibres, there seemed to be effused a gelatiniform fluid, particularly in those parts most deeply inflamed; in several places the mucous membrane had been entirely removed in patches or long streaks. This charred appearance of the œsophageal tunics was most apparent, from three to four inches above the cardiac orifice of the stomach, and encircling this aperture, the mucous membrane which existed in patches and the muscular fibres underneath were of a dark brown, brownish black colour, intermixed with streaks or lines of slate-blue. The slightest degree of traction separated the longitudinal and circular fibres, which were soft, possessing but little more consistence than muscular fibres in a state of decomposition. The interior of the stomach afforded a beautiful specimen of inflammation in different degrees of intensity, from a slight pinkish injection of the vessels of the mucous membrane to a deep purple or port-wine stain, confined chiefly to the vicinity of the orifices. A few inches from the pylorus, on the under surface, at the greater curvature, *the mucous membrane or coats of the stomach, were slightly* elevated into a white, silvery circular patch, resembling a surface which had been seared with a red-hot iron; the surface was not smooth, but exhibited a number of distinct projections with interspaces between them, which were considered to be the glands of the stomach; this whitish, seared circle was surrounded by a dark brown or charred margin; at a few lines distance were other portions of the stomach, similarly affected, but not to the same extent; the intervening spaces were denuded of the mucous membrane. The pylorus and deodenum had escaped, excepting the extension of inflammation.

The mucous membrane at the lesser curvature was swollen, villous, or velvety in appearance. With the aid of tests, the presence of corrosive sublimate in the stomach was easily determined.

Additional Hints as to the causes of Bowel Complaints on Board.

Besides bowel complaints originating in the intermixture of verdigris with the food, there are other causes to which the attention of Cooley emigrant agents ought to be directed with a view to diminish the rates of mortality on board. I now allude to the niggardly supply of warm clothing to the emigrants when they have embarked for Mauritius, or the West Indies.

The supply of clothing is so scanty, as to be altogether insufficient for the wants of these Indian labourers. It is the same, whether they leave Calcutta in the North-East or South-West monsoon, and consists of a rug, a red night cap, and the cooly's own filthy clout, called a dhootie.* Thus provided with clothing, the emigrants are obliged to endure every vicissitude of weather, every change of climate, at a time when from the cold the Commander of the vessel, and the European sailors on Board are wrapped up in flannel, cloth trowsers, and great coats. If such be the case with those born in a cold climate, and inured to changes in the weather, how much greater must be the necessity of the Cooley emigrant being warmly clad, reared as he has been from his infancy, under the grilling sun of Bengal.

The condition of Coolies labouring under an acute, a subacute, or chronic bowel complaint, is rendered still more unfavourable on board the vessel, in consequence of an additional supply of clothing not being provided by the Protector of emigrants, or the emigration agent, to replace those rugs, which when soiled, are flung overboard, in disgust by the patients themselves, or by some of their relatives. How frequently have I seen the misery endured by Coolies, recovered from an acute attack of the bowels, when thus circumstanced.

* These Notes were written on my return from Mauritius in October, 1845.

I have repeatedly represented and now repeat that a liberal supply of warm clothing, consisting of at least two flannel shirts, one coat and trowsers, made out of some coarse thick material would contribute towards the preservation of human life,—the health of the emigrants,—and a consequent decrease in the rates of mortality.

So long as these Indian labourers are shipped off from the ports of Calcutta and Madras, to herd together like so many swine on Board-ship, and so long as they are obliged to endure cold, wet, and every change of weather, from a calm to a hurricane, in a state bordering on nudity, can results other than high rates of mortality be expected?

Those, interested in a continuance of the system of emigration of Coolies from the shores of India, whether they be estate-proprietors residing in London, Mauritius, British Guiana,—or the West India Islands, ought to bestir themselves about the reform of abuses, such as I have pointed out here.

The principle of supplying available free labour to the Colonies from the coast of Africa to relieve the distress, occasioned by the emancipation of the negroes, and arrest the further destruction of property, may hereafter engage the attention of the British House of Commons and receive the sanction of Her Majesty's Government. The free, the unrestricted emigration of negroes, from the coast of Africa, conducted on sound, benevolent principles and freed from the abuses which have crept into the system of emigration of Coolies from the shores of India, ought to receive every encouragement from the English Parliament, and the Colonial Office.

Were this constant and well regulated influx of Negro Emigrants established, the West India Colonies would be benefited. It would release from the yoke of slavery thousands of negroes. It would enable hordes of semi-barbarized, ferocious savages from the interior of Africa, to witness the civilized condition of men of their own caste, men of their own colour. It would afford to them, as it has already done to the Coolies in India, an opportunity to enrich themselves, and carry back to their families and friends, their different tribes,

the well-earned fruits of their labours, and communicate to them the blessings of British liberty—above all, it might lead to the germs of Christianity being sown by the returned emigrants, in parts of Africa, where European has never yet set foot.

In the management of the Coolies, the Surgeon, in medical charge, should also be appointed Superintendent and should he directed by Government to exercise sole control over the Indian, or, as the case may hereafter be, African labourers. Emigrants of every description fare much better, when the Medical Officer is appointed by the Local Government Surgeon-Superintendent of emigrants, and is held responsible for their treatment. The authority of the officers, attached to the vessel, should be limited to the navigation of the ship, chartered for the emigrants.

Prevention is better than cure, is an aphorism, the value of which soon becomes apparent when the vessel is crowded with emigrants. To guard against the outbreak of bowel-complaint—fever, small-pox and other diseases, after the Indian labourers have embarked, is an object of the first importance, and one which at all times ought to engage the attention of the Surgeon in medical charge.

The cleanliness, ventilation, and fumigation of the between-decks require to be strictly attended to, by the officers of the ship, as well as by the Surgeon. I have found from experience that the practice of washing the between-decks has proved injurious to the Coolies, in consequence of the time taken up before the boards are thoroughly dried. When the Coolies are allowed to go down, they lie on the damp boards, and as a necessary consequence are attacked with fever, or inflammation of the lungs, or some other form of disease. It will be found far preferable to have the between-decks scrubbed dry, and then swept. Arrangements for the comfort of the sick, and for the preservation of the health of those on Board, may be enumerated here.

1. Two or more Portuguese topazes, or Hindoos of the sweeper caste, ought to be sent on board with the Coolies, for

the sole purpose of attending the sick. So little sympathy is evinced by natives, however closely connected by the ties of relationship, or caste towards each other, when attacked by sickness, that the services of Portuguese topazes are indispensable.

2. The Surgeon in medical charge, accompanied by the Commander of the vessel, should proceed to the emigration depôt in Calcutta, and allow none but men of athletic frame; of strong, robust constitution to be sent either by the Protector of emigrants or by the Emigration Agent. It is worse than useless, sending old, debilitated, worn out Coolies, to the Colonies. It is a sacrifice of human life. Labourers of this stamp are not required on the sugar estates in the West Indies. They cannot endure the hardships of the voyage, and generally die off, before the vessel reaches Mauritius, or the Cape of Good Hope. The Medical Officer will also do well to examine into the previous state of health of each emigrant labourer: he should especially enquire after the vaccination of each man, before he is allowed to embark; —otherwise if he take for granted that the report in the emigration ticket is always correct, he will find that he has been deceived. When infection breaks out he will regret when too late that they were received into the ship.

3. As an established rule, the food ought to be distributed in three separate meals,—if possible. But if this cannot be done, one meal ought to be served out in the morning, and another in the afternoon. A bad practice prevails in the chartered ships of serving out the food in one meal, to last during twenty-four hours. When, for the first time, the Coolies go on Board, whilst the ship lies at her anchors in the river, they gorge themselves with rice, dholl, ghee, &c., at a single meal. Half-starved in their villages they cannot resist the temptation of satiating the cravings of nature, and devouring at a single meal, more rice, dholl and ghee, than they were accustomed to eat in the course of a week, before they had volunteered to emigrate. As might be expected, they are usually attacked with fever, and diarrhœa, or dysentery.

4. Change of diet will be found beneficial. For this purpose, a quality of coarse biscuit, made of Indian meal, should be served out once a week, or at such times, when the state of the weather will not admit of cooking. Biscuit is a cheap article of food, much liked by the coolies, and very wholesome; certainly for diet, it is preferable to the choorah, or parched grain, which I have always seen served out in rough, boisterous weather.

5. As to medical treatment, unless when urgently required, the milder the measures are, the better they are borne. Even in acute inflammatory attacks, I have found that the coolies do not possess sufficient strength of constitution to withstand active treatment such as bleeding, and smart purging. With the natives of India, who return to Madras and Calcutta from the Mauritius, improved in the moral and physical conditions of life, more active measures of treatment can be resorted to. As preventive measures against the outbreak of contagion, exercise, and the enforcement of washing every morning, with salt water will be found useful. The more busily employed the coolies are kept at light work, the better health they enjoy.

6. To guard as much as possible against the outbreak of cholera the steamer should be in readiness to take the vessel in tow, as soon as the coolies have gone on board. Every possible delay in this respect should be avoided. No obstacles should be thrown in the way of the Commanders of emigrant ships to clear away from Calcutta, and every facility ought to be afforded to enable the vessel to put to sea at once. I can safely state from my own experience, and from the practice of every other surgeon, who has had medical charge of these coolies, and to whom I have spoken on the subject, that cholera seldom makes its appearance after the vessel has passed below Diamond Harbour. I have known many cooly ships proceeding from Calcutta and bound to the Mauritius and the West Indies, lose twelve, fifteen and twenty men from the effects of cholera, before the vessel has anchored in Saugor roads. Cholera and dysentery are two fruitful sources of mortality amongst men, women, and children in these vessels.

7. An extra quantity of warm clothing should be included in the list of medical comforts, and be provided for the especial use of the sick. I have already pointed out that to the niggardly supply of clothing, in a great degree may be attributed the mortality amongst the coolies on the passage.

Warm clothing to these Indian emigrants is as indispensable to their existence as the food they eat. The records kept by me, on board the ship Louisa Baillie, when in medical charge of the coolies returning from Berbice and Demerara to Calcutta, afford painful proof of the baneful effects of frost, cold, wet, and frequent changes of climate, on the constitutions of coolies when unprovided with clothing.

Let the reader of these notes, depict to himself how pitiable must have been the sufferings of the return coolies, provided with no more clothing than is worn by the same class in Calcutta, when we rounded the Cape of Good Hope, in the depth of winter. Could anything be more distressing to witness, than the scenes of intense suffering endured by the coolies thus miserably clad, when after quitting Simon's Bay, we ran down to 40° South Latitude, and whilst in this latitude, we had the misfortune to encounter for several successive days, terrific gales of wind, accompanied with hail, snow and rain?

On the night of the 25th August 1843, the vessel was scudding before the wind, under close-reefed topsails in Latitude 39 or 40° South. The decks were covered with snow. The cold was intense. The wind blowing in gusts, and piercing to the marrow. A cooly woman Shooqueeah by name, in perfect health, with an infant at the breast, had occasion to quit the between deck. She remained for a short time on deck. Benumbed with cold, she returned to her berth below. In half an hour afterwards her friends sleeping close by, were aroused by her groans. Alarmed, they rushed on deck, and called me from the cabin. Without delay, I hastened to render her assistance. On reaching the bottom of the gangway ladder, she gave a long, a deep, a heart-piercing groan. That groan was her last. She lay cold, stiff, lifeless, frozen to death. In the course of a few days after her death, several coolies died

also, although their lingering was more protracted. The immediate cause of their deaths proceeded from the intense degree of cold to which they had been exposed, from the insufficiency of warm clothing.

The act of shipping off coolies for the Mauritius and the West India Colonies without placing warm clothing on their backs, as well as placing good wholesome food in their bellies, constitutes a grave abuse in the present system of cooly emigration. An abuse of this description ought to have been corrected years ago. That it should have continued for any length of time betrays a want of foresight, if not censurable neglect, on the part of those directly connected with the emigration of Indian labourers.

ART. IV.—NOTES ON THE PHAGÆDENIC SPHACELUS, OR HOSPITAL GANGRENE; WHICH PREVAILED IN THE HOSPITAL OF HER MAJESTY'S 29TH REGIMENT OF FOOT AT FEROZEPORE, AFTER THE ACTIONS OF FEROZESHUHUR, 21ST AND 22ND DECEMBER, 1845, AND SUBRAON, 18TH FEBRUARY, 1846.

"We have had placed at our disposal a letter from Dr. Moore of the Gwalior Contingent, which will be found in a preceding column, consisting of observations on the Phagædenic Sphacelus, or Hospital Gangrene, which attacked the wounds of the men of H. M.'s 29th Regiment of Foot, after the actions of Ferozeshuhur and Subraon. It will be interesting to many of our readers, and is very creditable to the industry and abilities of the author as a member of the medical profession." —*Calcutta Englishman, July*, 1846.

When Her Majesty's 29th Regiment of Foot, was ordered to march from Hurreeke towards Lúdianah, to strengthen the force under Major-General Sir H. W. Smith, Bart. G. C. B. and Brigadier Wheeler, C. B. previous to the action of Aliwal, I was directed to proceed from the Commander-in-Chief's Camp, to Ferozepore, to take charge of the depôt hospital of the regiment.

The number of patients in hospital, transferred to my care, was 103. Of this number, 95 privates and non-commissioned officers, were suffering from the effects of wounds received in the action of Ferozeshuhur. In the wards of the hospital, gangrene was rapidly spreading amongst the men. In tents, pitched at a distance from the hospital, 16 patients were suffering from the disease. The case, in which the disease first declared itself was Private John Schofield, whose left arm had not been amputated, until he arrived at Ferozepore. The 18th of January 1846, was the day, on which the gangrenous appearance of the stump, attracted notice. From this date to the 26th of the same month, the number had increased to 15. With one or two exceptions, these cases were in the advanced stage of the disease.

Incipient stage, local appearances and constitutional symptoms.—Previous to entering upon a description of this disease, as it appeared in the hospital of H. M.'s 29th Regiment, it may be necessary to state, that the terms, phagædenic sphacelus, and hospital gangrene are employed by me, indiscriminately, to denote, destruction of the vitality of the tissues, cellular, muscular and fibrinous. The term, phagædenic sphacelus, when used exclusively, denotes the more rapid form of the disease, terminating in the destruction of the vitality of the tissues.

From the first indication of the wound having assumed a fretted, and irritable character, until the cellular, muscular, and fibrinous tissues, were totally deprived of vitality, the disease in its progress passed through three stages. The incipient stage was ushered in, by a marked degree of constitutional irritation. It was preceded by shiverings, slight at first, which gradually increased in strength and duration; by feverish restlessness at night; by constant headache; by urgent thirst, with a foul, clammy, and loaded tongue. The face became flushed. The skin was dry, and burning hot. The pulse was quick, ranging between 116—120 in the minute. The secretions were vitiated. The bowels usually were constipated. The secretion of urine was scanty and high-coloured. Perspiration was checked.

With these symptoms of constitutional irritation, the wound circular in shape, produced by grape-shot or musket ball, exhibited a change for the worse. Healthy in appearance, and progressing favorably hitherto, a state of local irritation now set in. The healthy purulent discharge, secreted in abundance from the surface, decreased in quantity, or was entirely arrested. In color, and consistence, it was also changed. The granulations, healthy in appearance at the previous dressing, sprouting up from the bottom and sides of the wound, and coated over with a creamy, purulent secretion, looked irritable, dry, and glossy. In some wounds, the granulations appeared tense and shining, distended with a semi-transparent, gelatinous fluid, whilst, in other wounds, the

granulations were flaccid, flabby, of a dark red, bordering on a purple color; agglutinated together in clusters, by a thick paste-like, morbid secretion of sanguineous, and purulent matter. In a few of the grape-shot wounds, the granulations and the edges of the wound were covered with a crop of minute granules, opaque, red, and purplish. This granular, or miliary eruption did not extend beyond the edges of the wound, and in general proved to be the product of 10 or 12 hours.

The edges of the wound looked red and tumid. The newly formed cuticle, appeared detached from the granulating surface, and became erect, glossy; pouting, painful; and very irritable, discharging in common with the unhealed surface, a thin, sanguineous fluid. The skin, close to the wound, exhibited different shades of redness. In immediate contact with the edges, the color was of a deep, diffused redness. At the distance of half an inch, or of an inch from the circular edge of the wound, this deep, diffused redness faded by degrees, into a bright scarlet, or pinkish color.

An extreme degree of irritability, not only in the surface of the wound, but also, throughout the entire transit of the ball, and at a distance from it, was complained of by the patients. The irritability of the wound, commenced with the change in its local appearances, and with the constitutional irritation of the system. The acute, pricking, lancinating pains were not confined to the immediate seat of the wound, but extended to remote parts. Painful tension of the limb, and a sensation of burning heat in the part, were complained of, at a distance from the receipt of the wound. If the wound, attacked by this specific inflammation, were situated on the hand, or forearm, these acute lancinating pains, extended to the armpit, and even to the lower parts of the neck. They have been felt also, under the pectoral muscles of the chest. In other cases, where the wound was situated on the leg; or, on the thigh, acute pains were felt, shooting upwards, and occasioning uneasiness in the groin, back, loins, and abdomen. The structures, in close proximity to, and encircling the base of the wound were dense, firm, resisting, and painful on pressure.

This hardness was the result of lymph effused beneath the skin.

Intermediate, and last stages:—local appearances, and constitutional symptoms.—The inflamed, and irritable surface of the wound, in the second, or intermediate stage, exhibited a greater degree of lividity. The transition from the first to the second stage, sometimes took place in a very short time. The deeply inflamed edges of the wound, presented numerous small, dark livid specks, or gangrenous spots. In their centre, these spots were black; but at the outer margin, the color was that of an indigo blue. The integuments, and subjacent tissues in the immediate vicinity of the wound, were infiltrated with a dark-colored, fluid secretion. They were more tumid, and more glossy than in the incipient stage. The parts were boggy, and pitted on pressure, instead of being hard and resisting. There was less pain produced by the touch. The discharge from the surface was scanty, high-colored, and intermixed with blood.

With the progress of the local disease, the type of the fever became more inflammatory. This was indicated by the increased quickness of the pulse: and by the change in its character. The volume of the pulse under the finger was more contracted; and less compressible:—its beats were sharp and wiry. The heat of skin was more pungent. The flushed and suffused countenance; the blood-shot eye; the racking headache; unquenchable thirst, the sleeplessness; and restlessness, and painful suffering endured by the patient, were more marked than in the preceding stage.

The transition from the second to the third stage, was indicated by the rapid and complete destruction of the vitality of the skin, and subjacent tissues; and by the extension of those dark, livid, circumscribed spots, noted at the previous dressing. The destruction of the tissues, was gangrenous in the full sense of the word. The parts intervening between the isolated livid spots, the structures of which, although inflamed had not been deprived of vitality, were now involved in one common mass. The third stage, was also indicated by a livid vesicated

margin, and by a dark bottle-green appearance of the integuments close to, but external to the edge of the wound; and by the black, charred, and not unfrequently ashen-grey color of the structures, occupying its centre. Large and small-sized vesications, filled with a claret-colored, serous fluid, formed beneath the integuments. In the worst description of cases, *the centre of the wound, with its putrid slough, resembled* a mass of rotten flax. This appearance was derived from the partially detached, and discolored shreds of tendon, and muscular fibres being besmeared with a thin, sanious, dark ashen-grey colored secretion; and from the cellular tissue being blown out, by the disengagement of sulphuretted hydrogen gas. A strong, fetid stench was exhaled from the wound. For some distance from the wound, the skin and subjacent tissues, pitted deeply on pressure. The infiltration of the surrounding cellular tissue with dark serous fluid, was extensive. Beyond the line, which marked the living from the dead structures, the relative shades of inflammatory redness were preserved in the rapid spread of the disease. In the immediate proximity of the mortified parts, the color was dark red, bordering on lividity. At a short distance from this the redness faded by degrees from deep scarlet into a light pink blush; which again fined down into the natural colur of the limb.

Amputations, attacked by inflammation, terminating in gangrene.—The amputated limb, when attacked by this specific inflammation, terminating in gangrene, presented almost the same characteristic local features of the disease. Between the fretted and irritable, and ichor-secreting surface of the circular flesh wound produced by grape-shot or musket ball, and the fretted, and irritable, and ichor-secreting lips of the amputated limb, there was not any perceptible difference. The amount of suffering endured by the patient, whose limb had been amputated, was more severe. The risk, from the greater extent of surface exposed, and from the important nature of the structures, involved in the disease, was proportionally increased. The prognosis as to recovery, was in consequence, more unfavourable.

In the incipient stage,—and in the transition from the onset,—to the second stage of the disease; the patient complained of acute, lancinating pains in the stump. The straps of adhesive plaister, however lightly or loosely applied could not he borne. The heat and tension of the skin, with a throhbing pain in the muscles, at a short distance from the face of the stump, rendered the application of straps of sticking plaister, a positive aggravation of the patient'a sufferings. The secretion of healthy pus from the stump was arrested. A thin, acrid, ichorous discharge followed its suppression. A hlush of inflammatory redness not only covered the face of the stump; hut encircled the limh for several inchea ahove the ampntated part. The varied appearances of the granulating surface, and of the tumid, glossy, pouting, and everted edges of the ampntated parts, did not differ much from the changes which had taken place in the granulating surface, and edges of the grape-shot, and gun-shot wounds, already described.

When thfs diffuse specific inflammation had haffled every effort on my part to arrest its progress, and had advanced to that stage in which the vitality of the parts attacked was destroyed; the edges of the stump, whether recently agglutinated, or previously well cicatrized, hurst asunder, and became everted. The entire surface of the amputated part gaped wide, and was changed in color. The internal structures of the stump, were exposed to view. Dark, livid, bluish streaks were seen, traversing the lips of the ampntated limh, in a longitudinal direction from extremity to extremity, on its internal aspect. A thin, dark, fetid, acrid, discharge was secreted in abundance. (Edematous swelling of the limb, with effusions into the hursæ and synovial membranes of the joint, close to the amputated part, ensued.

The constitutional symptoms in this advanced stage of the disease were those of the acute, inflammatory type noted in the intermediate stage. Thia refers more particularly to the generality of cases of flesh wounds. The pulse continned quick, and hounding, incompressible under the finger. The heat of skin was pungent. Thirst, loss of appetite, a foul and

loaded tongue, want of sleep, restlessness, and anxiety, were the chief symptoms present. The local pain in the wound, was deadened. The burning heat, experienced at first in the seat of the wound, and along the transit of the ball, was modified. In one case of amputation, and in another case of grape-shot wound, which terminated fatally, the full and bounding pulse, noted in the first, and second stages of the disease, changed in the third stage, to a small, sharp, wiry jerk, and in frequency *exceeded 140 beats a minute. The anxiety, and* restlessness of the patients; the dark and dusky flush on the cheeks; the sunken eye-balls; the pinched and retracted state of the features were more marked. At intervals, the patients dozed away, muttering in a low delirious manner. Involuntarily, they jerked their limbs about, as if the muscular, and nervous systems were seized, at the moment, with convulsive, spasmodic twitches. When aroused, and spoken to, in a forcible manner, their senses seemed to be collected. Their answers were rational. Their complaints of local pain; of thirst; of chills; of an internal burning heat; were consistent. When their attention was no longer fixed, they relapsed into their former state of restless drowsiness. A cold clammy sweat, with cold extremities; hiccough; a dry, parched, brown, and fissured state of the tongue; and a tympanitic distension of the abdomen, preceded death in each case.

This distressing catalogue of symptoms, was noted at the bedside of Ensign Mitchell, the dressing of whose stump devolved on me, in the absence of Surgeon Taylor, with the Head-Quarters of the Regiment. He died on the ninth day after the leg had been amputated, from the effects of the gangrenous condition of the *stump. The same symptoms, preceded* death, in the case of a private, whose wound produced by grape-shot, assumed an unhealthy gangrenous appearance, which spread rapidly and extensively.

In a few cases, however, the onset of the disease was so sudden, and unlooked for; the spread of the inflammation was so extensive; and followed up by mortification of the tissues, so quickly, that time was scarcely allowed to trace the progress

of the disease, from stage to stage. The wonnd which looked healthy at the evening dressing, and was cicatrizing satisfactorily, presented on the following morning an extensively inflamed and mortifying surface, spreading in every direction from the centre of the wound to the surronnding parts.

Tissues destroyed by gangrene.—All tissues alike, were snbjeet to the destructive effects of this specific inflammation, terminating in gangrene. The cellular, muscular and fibrinous tissues suffered in proportion to their relative degrees of vitality. Of these, the cellular tissne and the skin suffered more extensively than the other structures, and in the majority of cases, were the only tissnes deprived of vitality, and reduced to a black fetid, deliquescent slough. The sheaths of veins, arteries, and nerves were attacked by the disease, and sloughed away. The coats of the vessels remained exposed. The fibrils of the nerves separated from each other. In four cases, the coats of the arteries slooghed away, and profuse hæmorrhage ensued. In two of these cases, the coats of the internal and external malleolar arteries gavo way. In a third, the coats of the radial and anterior interosseous arteries, and in the fourth, the coats of the posterior interosseous artery of the fore-arm sloughed away.

The slonghing of the coats of the superficial and deep-seated veins, occurred in several cases. In Private Nowlan, very troublesome hæmorrhage, ensued. The calf of the right leg had been carried away hy a round shot, on the 21st Decemher 1845. The hæmorrhage was checked. The wound was dressed, and the man was sent into Ferozepore, on the 24th of Decemher. Nearly six weeks afterwards, whilst the wound was granulating, and closing in by degrees, its surface and edges, assumed the characteristic features of the incipient stage of gangrene. As the disease progressed, the sheaths of the deep tibial, and peroneal veins slonghed away. The vessels remained in this denuded state for several days, when tho coats of the veins, from their extreme attenuation, and from being deprived of their remaining vitality, gave way, and considerable hæmorrhage was the result. In cases, where amputation of the limh conld not be performed, without the obvious risk

of hastening the patient's death, the frequent recurrence of venous hæmorrhage, however slight, proved troublesome to check, and dangerous in its consequences. The lives of several patients were endangered by the loss of blood, occasioned by the sloughing of the venous coats. This venous hæmorrhage, added to the loss of blood sustained on the field of battle, to the adynamic type of fever, and to the debilitating effects of the gangrenous disease on the constitution, proved fatal in two cases.

Fortunately, the coats of blood-vessels, when denuded of their enveloping sheaths, do not necessarily give way. In two privates, and one non-commissioned officer, wounded in the actions of the 21st and 22nd December 1845, by grape-shot, extensive destruction of the cellular, muscular, and fibrinous tissues took place. Of these three men, one was wounded in the right, and two in the left thigh. In each case, the uneven, welded iron balls struck the thigh in front, about 3½ inches from the groin, and passed obliquely outwards in one; inwards, in a semi-circular direction, without striking the bone in another: whilst, in the third, the non-commissioned officer, the ball somewhat spent in force, struck the fore part of the thigh; penetrated the skin and muscles, as far as the bone; received a check in its transit, and lodged on, without producing fracture of, the bone. The parts interposed between the entrance and exit orifices of the balls, became involved in the gangrenous condition of the wound, on the fore-part of the thigh. After the sphacelation of the tissues had ceased to spread, the separation of the sloughs brought to view the sheaths of the femoral vessels. At a subsequent dressing, the relative position of the artery and vein was made apparent by the partial sloughing of the femoral sheath. The pulsations of the femoral artery were distinctly visible, throbbing with some degree of excitability. About the tenth part of an inch, or perhaps a little *more*, of the femoral sheath had sloughed away, which left the artery and vein denuded. The enveloping sheath remained exposed to view, for nearly three-fourths of an inch. In Private Ponntain's case, the external saphena vein, lay on the

surface of the bare muscles; loose; unconnected with the surrounding parts, an obliterated chord.

The destructive effects of this specific inflammation, in the vicinity of the joints of the upper, and lower extremities were serious. The tendinous insertions of the muscles, separated from the fleshy portions, and slonghed away in detached masses, or in long, black, macerated fibres. From the minor degree of vitality, which tendon possesses, it was less prone to yield to the influence of gangrene. Unlike the cellular and muscular tissues, it did not fall into a black, or ashen-grey deliqnescent slough. The separation of the tendinous fibres, was slow, tedions, and in small hundles at a time. In the hand, and on the anterior aud posterior surfaces of the forearm, the tendinous insertions of the flexor, pronator, and supinator muscles, have remained for some time, hanging from the wound, after the sloughs of the cellular and muscular tissues have separated. So tedious was their detachment from the parts possessed of vitality, that frequently it was found necessary to cut them off with a scissors, to prevent their retarding the subsequent granulation of the wound.

Deeper still did this phagedenic destruction of the vitality of the tissnes penetrate.

The simple flesh-wound on the surface lately healed, when once snbjected to the influence of the disease, opened out afresh. The edges of the amputated limh recently cicatrized burst asunder. The cementing structure, which knit together the fractured extremities of the bones, in the short space of a few hours, was deprived of vitality, softened, and reduced in consistence to the condition of the sphacelated parts surrounding it. The unceasing efforts of nature to repair the injuries sustained hy the soft, and bony structures of the limb, proved of no avail. The process of union by which the fractured parts of the hones had heen cemented together, was checked not merely in its progress towards ossification, but completely destroyed. In the subsequent suppuration during the separation of the gangrenous sloughs, fragments of hone with pus and blood, and with detached pieces of cartilage have heen

discharged from the wound, leaving the fractured extremities of the bone separated from each other, by a considerable interval.

Number of cases under treatment, when the action of Subraon was fought.—On the morning of the 10th February 1846, there were 47 Privates, and non-commissioned officers under treatment, for this gangrenous condition of the tissues. There were also seventeen men whose wounds were so far recovered from the effects of the disease, that they looked clean and healthy, and were granulating from every part of the surface. In this number is included every case of the disease, whether the form it assumed were slight or severe.

The incessant roar of Artillery immediately after day-break from our own, and the enemy's howitzers, mortars, and 24 pounders, accompanied at intervals with a distinct "tremblement de terre," announced to us, who were detained at Ferozepore to receive the wounded, that that hard contested and gloriously won battle, "Subraon," had commenced.

Infected as this hospital was with the disease under notice, and aware that the gallant fellows of the 29th, would maintain by their indomitable courage the high repute gained at Ferozeshuhur, and be foremost in the ranks where duty called *them*; *where death, and wounds, and glory awaited the soldier*, I contemplated with dread their future sufferings, from the effects of their wounds being attacked by this specific inflammation terminating in mortification.

The disease which had been on the decline in the hospital, since the first of February, suddenly revived in full vigour. In the course of a few days, many of the wounded received from the battle field of Subraon, suffered from its influence. In the majority of cases the form of the disease presented features of extreme virulence. Contrasted with the features of the disease noted 12 or 15 days previously, this difference was the more striking. The edges of the wound looked inflamed, glossy, and irritable. In those extensive longitudinal cuts, inflicted by the Sikh tulwars, some on the head, others on the arms and legs, and others again on the neck and back, the

adhesion by the first intention which had partially taken place, gave way. The secretion of healthy, purulent, cream-coloured matter was checked: when renewed, it was changed in colour and consistence. The lips of the wound soon assumed a deep red purplish and gangrenous appearance.

The constitutional fever in those recent cases received into hospital after the action of Suhraon, was inflammatory. The type of the fever was acute and strongly marked. The face was flushed. The skin was burning hot. The patient complained of racking pains in the head; of loss of appetite; of constant thirst. The tongue was foul and loaded: the pulse full, bounding and incompressible. In the wounded parts burning, throbbing pains were felt; and in the limb fulness, weight and tension. From want of sleep, the patient was very restless in bed.

Difference in the types of the fever.—The acute, inflammatory type of fever was more strongly marked in the wounded, after the action of Subraon; than in those brought in from Ferozeshuhur, whose wounds did not exhibit an unhealthy action for three, four or five weeks after their arrival at Ferozepore. The type of the fever in those cases, connected with the local condition of the wound, partook of the low, typhoid, adynamic form. In like manner, the local inflammation in the cases from Subraon and the subsequent sphacelation of the tissues, were acute, extensive and rapid. To so great a degree was this the case; that no defined limit could be fixed upon, as the probable extent of the destruction of the adjacent structures, during the next 24 hours. In the Ferozeshuhur cases, however, the progress of the gangrene was not so rapid. A limit to the destruction of the vitality of the tissues could be assigned. The utmost extent of the destruction of parts during the ensuing 24 hours, could be calculated upon with tolerable accuracy.

Progress of the gangrene slow where the type of the fever was typhoid.—The local inflammation was slow in its progress towards the stage of complete destruction of the surrounding parts, in those cases where the type of the fever was low, ty-

phoid, and adynamic. Although slow in its development on the surface the gangrene penetrated deeply, and spread widely through the internal cellular, muscular, and ligamentous structures of the limb. The progress of the mortification was slow, and not so uniform in the course pursued as that in the sthenic, acute form. The line which indicated the separation between the living and the dead tissues, was irregular, interrupted by long narrow stripes of a livid colour. In a few cases of the worst description, these stripes were yellowish green, or of a dark bottle-green colour. Beyond these stripes of deadened skin and cellular tissue, the deep inflammatory blush seldom extended more than a quarter, or half an inch.

Synovial membranes of the joints.—Effusion into the bursæ, and synovial membranes of the joints, occurred more frequently in the acute, sthenic form of the disease, than in the slow, typhoid type, when the specific inflammation was in active operation close to the joints. In Private O'Keefe, the muscles of whose right arm had been lacerated by a round shot, above the elbow joint; and in Judd, a non-commissioned officer, whose left thumb had been carried away and the muscles of the arm and fore-arm partially lacerated, and the left side between the 10th rib, and the crest of the ilium, severely contused by another round-shot; copious effusion into the synovial membranes of the wrist and elbow-joints, ensued after the wounds took on, an unhealthy gangrenous action. In the lower extremities also, the knee and ankle joints suffered from acute inflammation of the synovial membrane, and from effusion into the bursæ, and synovial sacs. This was noticed more particularly in cases, where, the type of the fever was acute inflammatory; where the local condition of the wound passed rapidly from one stage, into another: where, the sphacelation of the several structures spread with regularity in the circular form from the centre of the wound, and deprived of vitality all the tissues which came under its influence: and where the acute inflammatory action in the neighbourhood of the joints extended in every direction, beyond the apparent line of the living and dead structures.

Complicated with diseases of the internal organs.—When complicated with an inflammatory state of some one of the internal viscera, the recovery of the patient was protracted. Inflammation of the mucous membrane of the large intestines, terminating in ulceration, was the most frequent complication —and that form of disease most to he dreaded. In such cases where death has occurred, the patients sank under the effects of dysentery,—more than from the effects of the sloughing wound. The same observation was made in a case where the parenchymatous tissue of the lung had become solidified; and a copious serous effusion had taken place into the pleural sac.

Treatment.—From the date of the transfer of the Depôt Hospital to my charge, I was guided in the treatment of this disease by two principles. The first principle in the treatment had reference to the constitutional derangement of the system:—the second to the local condition of the wound. In every case it was necessary to bear in mind, the type of constitutional irritation, under which the patient laboured. It was necessary to decide, whether the type of the fever was sthenic,—acute,—inflammatory;—or, asthenic,—low,—typhoid. Farther it was necessary to ascertain, whether the fever present was entirely dependent on the local condition of the wound,—or, had its seat in some acute, inflammatory lesion of one or more of the internal viscera, with which the gangrenous condition of the wound or amputated limb might have been complicated.

The acute, inflammatory, sthenic form of fever prevailed in those, whose wounds were attacked with hospital gangrene after the action of Subraon. The wounded were brought into Ferozepore, on the afternoon of the 11th February. In these cases the pulse was full and bounding. The skin was hot. Perspiration was checked. The bowels were constipated. There was a high degree of feverish restlessness and anxiety about the patient. His face was flushed. The eyes were blood-shot. Headache—want of sleep,—urgent thirst,—and loss of appetite were complained of.

In the wound wherever situated; at the entrance and exit,

—and throughout the transit of the hall, the local pain was stated to he as severe as if the entire surface had heen scared with a red hot iron. In close proximity to the wound the local appearances were;—tension and fulness of the limh;—irritahility of the surface; redness; and puffiness of the edges, with surrounding induration of the skin and cellular membrane from effused lymph.

So early as the second day after admission into hospital, did this specific inflammation manifest itself in the wounds of three Privates. On the 14th, 15th, and 16th of February, the disease continued to spread with rapidity. The number of men suffering from its effects, and in whose wounds the first stage of the gangrene had distinctly declared itself, had increased to eight.. There were four others in whom the edges and general local appearances of the wounds looked suspicious.

The use of the Lancet.—The constitutional treatment adopted in cases of this description, consisted of general depletion and free purgation. Similar measures had heen employed with success in men of robust frame, whose constitutions had not been much impaired by the wounds received in the action of Ferozeshuhur. When the lancet was used, 10, 12, or 16 ounces of blood were taken away. The quantity abstracted was regulated by the strength of the patient, and hy the state of the pulse. Guided hy the character of the pulse, venesection was repeated or not, within the ensuing 36 hours. Eight grains of calomel and six grains of Jnmes' powder, or five grains of antimonial powder, (when the stock of James' powder was expended) were given in an hour after the hleeding. In 12 hours afterwards the common purgative draught composed of Epsom salts and senna:—or, 10 drachms of Castor oil with an ounce of Peppermint water were in general sufficiently active to clear out the howels. On the following night, the calomel and antimonial powder, six grains of each were repeated, and the purgative draught, or purgative enemata administered to keep up the action of the howels.

Tartar Emetic.—If the acuteness of the inflammatory fever did not yield to the first blood-letting, venesection was again

prescribed. The blood in general exhibited a deep buffy coat with the surface cupped. The coagulum was small, compact and floating in a large quantity of serum. In addition to this the antiflogistic line of treatment was still pursued by ordering a mixture of tartar emetic, 2 grains, tincture of opium from 40 to 60 drops, water 10 ounces: of which an ounce was taken every third hour. The combination of laudanum with tartar emetic rendered it unnecessary to prescribe an opiate draught by itself to relieve the patients' sufferings.

The tartar emetic, when borne by the stomach, was increased on the second and third day, to 3 grains. In a few instances, if retained without producing vomiting or purging, the quantity was increased by another grain. No corresponding increase in the quantity of the tincture of opium was made. After careful watching of the effects of this combination of medicine on the system of the patients, for whom it was prescribed; and the influence exercised by it over the course of the fever, in not a single case have I had occasion to regret its employment.

I know not a more powerful remedy than tartar emetic for subduing the acute, inflammatory type of fever, in the early stages of hospital gangrene, when administered frequently in graduated and cumulative doses. Complete prostration of the system is the object, for which tartar emetic ought to be prescribed. Through its means that complete prostration of the system can be effected. Anodynes when prescribed alone, excited the system. They produced more harm than good. But, under the nauseating influence of the tartar emetic and the soothing anodyne effects of the opium, combined with the previous loss of blood from venesection, and with a clear state of the bowels from purgatives, the feverish excitement of the patient has been subdued:—the restlessness and the anxiety have been removed. The full bounding, throbbing pulse has become soft and compressible. The small, hard, wiry, jerking pulse has expanded. The blood has circulated through the arteries and through the system in general, more freely and more equally. The flush on the cheeks;—the suf-

fusion of the eyes;—the feeling of constriction across the eyebrows and forehead have gradually become less. The pungent heat of skin was replaced by a softness and moisture of the surface. Perspiration was relaxed: thirst was diminished: and in several instances the patients have expressed a feeling of relief beyond their expectation.

Such were the results of venæsection,—of purgatives and of tartar emetic in the constitutional treatment of those cases, in which the type of the fever was sthenic acute, inflammatory.

Essentially different from this was the treatment adopted in those cases, where the gangrenous condition of the wound was accompanied by the low, typhoid, adynamic type of fever. The Privates and non-commissioned Officers wounded on the evening of the 21st, and the morning of the 22nd December, in the action of Ferozeshuhur, suffered more particularly from the low irritative form of fever. Their history may be briefly stated. Exhausted by loss of blood they lay in a state of utter helplessness on the field of battle, from the 21st to the 24th. For more than 48 hours they remained thus exposed to the heat of the sun, without food,—without covering,—without water;—without even strength sufficient to call to a passing comrade for a drink of water. On the evening of the 24th; and, on the afternoon of the 25th and 26th, they were conveyed to Ferozepore on hackeries. Those who had received wounds in the arm and were sufficiently strong walked into Ferozepore, whilst their less fortunate comrades disabled by weakness and by wounds in the lower extremities were jolted over a broken, and jungly road for a distance of twelve or thirteen miles. The morning of the 25th was the earliest day, on which medical assistance could be afforded to the severest and most formidable description of wounds. When in the latter part of January, the wounds in these cases were attacked by hospital gangrene venesection was not employed, nor could it be employed without injury to the patient. Active purgatives were prescribed with caution. Opiates in powder, or in tincture:—the preparations of the acetate and muriate of morphia were administered with a free hand, so long as the medi-

cines lasted, or could be borrowed from a neighbouring hospital. The debilitated state of the patient was supported by a nutritious diet, and by the use of beer, porter, or wine. Calomel and antimonial powder in equal proportions of 5 grains each, followed by a dose of Castor oil in 10 or 12 hours, were sufficiently active for regulating the bowels. A combination of 4 grains of quinine and ½ of a grain of muriate of morphia, agreed with the patients from the tonic and soothing influence produced by these medicines in the system.

The chief index in regulating the treatment of the disease upon antiphlogistic, or non-antiphlogistic principles was the type of the attendant fever. On it depended the use of the lancet,—active purgation; with the administration of tartar emetic;—or, the reverse;—the tonic and stimulating plan of treatment.

Treatment of the spreading gangrene,—locally.—The local treatment of the spreading gangrene varied but little whatever the constitutional treatment might have been. The pure nitric acid applied, so as to circumscribe the gangrene proved efficacious in almost every case. On it, I chiefly relied for checking the farther spread of the disease. With the nitric acid, a narrow and deeply burned circle was drawn over the inflamed, but otherwise sound skin about the sixth part of an inch, beyond the blue, livid, or purplish margin, which denoted the extreme point to which the gangrene had spread. The acid was rubbed in carefully with the point of a probe, covered tightly with one fold of lint:—or, with a few loose threads of tow wrapped tightly round the blunt end of the probe. The mortified tissues were completely circumscribed in this manner. As soon as the narrow yellow circle was finished, a piece of lint steeped in chloride of lime was spread over the gangrenous surface. The wound was then covered with a poultice of linseed meal and charcoal. If the inflammation of the skin and cellular membrane was extensive; or, in the vicinity of the joints either of the upper or lower extremity, the parts beyond the burned circle were freely leeched. Leeches afforded relief whether applied within, or without the circle, if close

to a joint where acute inflammation of the synovial membrane existed with effusion into the synovial sac.

The boundary line between the living and dead structures formed by the destruction of the tissues, still possessing vitality required to be carefully and effectually made with the strong nitric acid; or, by means of some other escharotic equally powerful. There is no peculiar specific virtue in the nitric acid over any other escharotic, in checking the spread of the gangrene. But whatever the escharotic may have been; its application to the surface and edges of the wound, where the skin and cellular membrane were in a gangrenous condition, instead of its application to the skin in an inflamed, but otherwise sound state proved worse than useless. The nitric acid thus applied, acted more as a stimulus to, than as a check upon the farther extension of inflammation and mortification of the skin and cellular membrane, remote from the centre of the wound. The amount of pain produced by the application of the acid to the wound was the same, without securing to the patient the chance of the disease being arrested. From a number of observations made in reference to the mode of applying the acid, whilst the wounded remained under my charge, it was clearly proved that unless the cutis,—rete mucosum,—and cuticle, in a sound, unsphacelated condition, were brought effectually under the influence of the acid, and unless the vitality of these tissues were thoroughly destroyed instead of limiting,—the spread of the gangrene was promoted.

Other local applications were fairly tried in several cases without resorting to the aid of nitric acid. Leeches,—extensive scarifications,—deep incisions,—fomentations,—and poultices of every prescribed form were tried. But I must add, that in not one instance was the spread of the gangrene arrested,—nor, did the results prove satisfactory. Previous to the return of the Surgeon of the 29th Foot, from Kussoor to Ferozepore, I had ample opportunities and sufficient time for testing the value of local measures in the treatment of hospital gangrene. From the comparative degree of success, with which the use of the strong nitric acid was attended, I felt con-

vinced, and, even now, I do not hesitate to recommend, that its immediate application should not be delayed on the first indication of the wound having come under the influence of the local specific inflammation.

In addition to the constitutional treatment, circumscribe the disease locally:—This cannot be accomplished unless the spreading gangrene be circumscribed by the destruction of the vitality of the sound skin,—the sound rete mucosum,—and the sound cuticle, through the instrumentality of some powerful escharotic. This may be objected to as a severe local remedy. During the time, the acid was rubbed in and for a short time afterwards the pain felt was severe. The subsequent relief however from the original fiery pain in the wound, and from the pain caused by the acid was almost immediate. Whilst I have rubbed in the acid, tears have fallen on my hand from the very men, a fibre of whose muscles never quivered, when carrying at the point of the bayonet, batteries vomiting forth death and destruction amongst the ranks of this noble Regiment. So great has been the relief subsequently felt, that in cases where the wounds corresponding to the entrance and exit orifices of the ball suffered from gangrene, and only one of the orifices had been circumscribed, the men have sent for me to apply the "vittrul" to their second wound.

The time lost by resorting to less severe local measures, is irreparable. The opportunity afforded for the deep and widespread destruction of the skin and cellular membrane; of the muscular and fibrinous tissues, cannot be retrieved. The subsequent injury sustained by the constitution, has proved serious.

With few exceptions, the gangrene stopped short at the line, drawn by the nitric acid. Beyond this, the dark, livid, deliquescent slough, seldom extended. In four cases, however, the gangrene did reappear on the external margin of the burned circle; but in each patient, at that particular part of the burned circle, where there were strong reasons for suspecting the nitric acid had not penetrated sufficiently deep to destroy the cutiele. The yellow band formed by the nitric acid, remained untouched by the disease. The recently mortified parts, were

thus separated from the centre of the wound, in which the gangrene had originally appeared.

Under these circumstances, the nitric acid has been re-applied, beyond the terminating line of the gangrene. The segment of a circle, of sufficient size to circumscribe the disease, has been burned. After the second application of the nitric acid, I cannot find in the abstract of cases, entered in my note-book, a single instance, in which the gangrene repassed this secondary burned line.

Caustic Potass was substituted for nitric acid in one case; but not with more beneficial results. In their action, they differ but slightly from each other; that is, in the destruction of the vitality of the cutis, rete mucosum, and cuticle with the subjacent intermuscular cellular tissue. Caustic Potass is apt to spread after its application; and thus the burned circle presented a greater width in its circumference, than that made by the nitric acid.*

Poultices.—The materials of which the poultices were made, did not appear to produce a decided change in the disease. It appeared to be immaterial, whether the simple linseed meal poultice was used; or, the poultice of linseed meal, mixed with charcoal, or again, the fermenting poultice. In the application of poultices to the wounded parts it was necessary to bear in mind, that whether cold or warm, the poultices extended beyond the limit of the inflammation, so as to remain in contact with the healthy unaffected skin: and, that the poultices were changed every sixth hour.

A poultice if allowed to remain on a wounded part, for 12 or 15 hours without being changed, did more harm than good. The materials became dry and hard; and tended to increase, rather than to diminish the inflammation of the parts to which the poultice had been applied. But, on the other hand, if changed frequently, the redness and inflammatory blush, remote from the centre of the wound, disappeared. The skin

* Lunar Caustic has been tried in the first stage of the disease, with success, where applied in the manner directed above. In the advanced stages, its efficacy was not so apparent.

hccame pale, and corrugated. With thc corrugation of the skin, the patient was relieved in a proportionatc degree from pain.

On the 5th or 6th day, after the application of the nitric acid, tha gangrenous mass in the centre of the wound hecama detached from the suhjacent healthy tissues. In the course of a few days more, other portions of the slough were removed by scissors. The skin and cellular membrane dcstroyed by the acid, forming the yellow circular band, separated, and exposed to view a clean healthy edge, and an extensive, hut clean, healthy snppurating wound, granulating from the bottom and from every part of the exposed surface.

With the separation of the slonghs, whole layers of muscles, and tendons of the forearm and arm, of thc leg, thigh, and abdomen; of the back, and shoulder, have been denuded of integuments and cellular tissue. The scalpel of the anatomist has never dissected with greater nicety, nor with greater skill, the intermuscular cellular tissne, than did this disease. The destruction in part of the fibres of the muscles and of the fibres of the tendons, causad during the progress of the gangrene, was clearly exposed to view.

The annexed case, will serve to illustrate the extent to which the destruction of the cellular, muscular, and fibrinous tissnes will progress, when attacked hy gangrene. The details will serve to point out the necessity of applying at an early period, the nitric acid to circumscribe the spreading gangrene. They will also serve to illustrate the success, by which the re-application of the nitric acid was attended, after tha disease had passed the first circle, or boundary line; and in consequence rendered it necessary, to re-circumscriba the gangrenc by a secondary line, or segment of a circle.

Perforation of the shaft of the humerus without fracture.—At Suhraon, Private William Fryar, in rushing forward to the Seikh intrenchments, to protect the body of that bravest and most beloved of men, Lieut.-Colonel Taylor, C. B. from being mutilated, was struck by a musket ball in the right shoulder. Hc staggered. The arm fell powerless by his side. The musket dropped from his grasp. When conveyed to the rear, the

wound was dressed; and on the afternoon of the 11th February he with 46 others, arrived at the Depôt hospital.

The wound was examined. It was small and circular, on the inner side of the deltoid muscle; high up; close to, but on the inner side of the acromion process of the clavicle. The exit orifice of the wound, through which the ball had cut its way, was small and jagged; situated on the dorsum of the scapula, midway between the inferior angle, and the spine or ridge of this bone. Fracture of the bone was suspected. In the examination of the humerus, however, there could not be detected the slightest crepitus, nor the slightest grating in any part of the arm. The head of the bone moved freely in the socket, backwards and forwards. The arm could be elevated, or depressed, without inconveniencing the patient: but without assistance, he could not raise, nor press the arm firmly to his side. There was considerable stiffness, and some pain in the shoulder.

In having failed to detect crepitus, and in the absence of lengthening, and shortening of the arm, with perfect movability of the head of the humerus in the glenoid cavity of the scapula, and capsule of the joint, I with others came to the conclusion, that the ball, aimed at this man from above, pierced the skin and muscles in a slanting direction:—and, in its transit, swept in a semi-circular direction, round the head of the humerus, and then passed almost in a straight line outwards, cutting its way, through the muscles, cellular tissue, and skin, on the dorsum of the scapula.

We erred in opinion.

The wounds, corresponding to the entrance, and exit of the ball, in four days after admission into the hospital at Ferozepore, presented an inflammatory blush on their edges. They looked irritable and glossy. The secretion of healthy purulent matter, diminished in quantity, became viscid, glutinous, and glairy. From the internal surface of the ball's transit, this vitiated secretion constantly oozed out. The constitutional irritation kept pace with the local irritation of the wound. The accompanying type of fever was acute, inflammatory.

The inflammation of the wounds was not subdued, nor its spread checked by the application of leeches, by deep scarifications through the hardened base and edges, nor by the use of poultices, combined with constitutional treatment. This inflammatory condition of the skin, and cellular membrane, diffused itself extensively. In its progress, the inflammation passed quickly from the first to the second stage of gangrene, and finally reduced to a dark, livid deliquescent slough the cellular and, in part, the muscular tissues in the vicinity of the shoulder joint, on the back of the scapula. The rapidity of its progress outmarched all calculation.

When the gangrene was spreading thus, hourly, and no limit to its destruction of the vitality of parts, superficial and deep-seated, could be fixed, a narrow circular band was drawn by the strong nitric acid, round the mortified mass, about the sixth part of an inch from the irregular line, which marked the separation between the living and dead structures. In front, and also behind, these circular bands were drawn separately and were deeply burned. The surface of the gangrenous mass was covered with a cloth, steeped in chloride of lime; and afterwards, the whole was covered with a poultice made of charcoal, and linseed meal.

At the orifice of the wound, corresponding to the exit of the ball on the scapula, the gangrene passed beyond the boundary line, and re-appeared on the external margin of the circle; at a point where, it may reasonably be inferred, the acid had not penetrated to a sufficient depth. Elsewhere the spread of the inflammation and gangrene appeared to have been arrested. The nitric acid was re-applied about the fourth part of an inch beyond the limit of the gangrene, so as to circumscribe it completely. Beyond this secondary line the gangrene did not re-appear. Within it, the destruction of the vitality of the skin and cellular membrane was stopped.

In the subsequent detachment of the gangrenous mass from its adhesion to the subjacent healthy structures, and in the sloughing of the yellow circular band burned by the nitric acid, a wide extent of surface was exposed. In the daily se-

paration of these masses of putrid cellular tissue, with portions of muscular fibre, several spiculæ of bone attracted attention. They were discharged from the internal passage and through the entrance orifice of the wound.

As soon as the sloughs were cleared away, the muscles in front and behind were exposed to view; loose, partially destroyed, hanging apart from each other, with a portion of the bone in front, denuded. The transit of the ball could be distinctly traced. The ball passed directly through the substance of the humerus, immediately below the anatomical neck of the bone, without shattering it to pieces. On either side of the bony canal there was the solid bone, which formed the walls of the passage cut in the ball's transit. The outer wall was thin but perfect. From the internal surface of the wound I extracted with a small pair of pocket forceps several fragments of bone; after which, the course taken by the ball was more clearly displayed.

Hæmorrhage from the veins, and small anastomosing arteries, previous to our quitting Ferozepore, caused excessive debility. His recovery was protracted, and for some time uncertain. Change of air, after our first march, produced a marked improvement in the state of the wounds, and in his general health. The bracing air of the hill station of Kussowlie completed his recovery.

Subsequent dressing.—The dressing of the wounds and suppurating sores, after the separation of the gangrenous mass, requires to be noticed. Powdered bark was sprinkled over the surface, and covered with simple dressing, or an opiate cerate. The wounds, however, dressed in this manner, did not granulate more quickly, nor more healthily, nor did they cicatrize sooner, than those wounds, in which all the crevices and intermuscular sinuses, were filled up with charpie, and afterwards covered with spermaceti ointment.

One advantage appeared to be derived from the use of powdered bark. When fresh and of good quality, and when sprinkled over so extensive a suppurating surface, the tonic principle of the bark appeared to be carried into the system

hy the ahsorbents. From a carefnl examination of the cases, treated according to the principles detailed first, in reference to the constitutional symptoms, and secondly, in reference to the local disease, a marked improvement took place, as soon as the sloughs had separated; and a thick, yellowish, purulent matter was secreted from the surface. In the greater number of cases, the feverish symptoms passed away. The patient's skin hecame cool. The pulse became regular, the tongue moist, the appetite improved. Excessive debility was the most prominent as well the most unfavorahle symptom in five or six cases.

Antiphlogistic measures were discontinned. The tartar emetic, and opium mixture was replaced by quinine mixture, or by a comhination of qninine and morphia in powder, every fourth hour. A generons, nutritious diet, with half a bottle of beer, or porter was allowed. Thesc measures had to be adopted almost from the commencement, in those patients who suffered from the adynamic, typhoid type of fever. The debilitated state of the system called for aupport, long before the separation of the gangrenons mass took place and before the healthy suppuration of the wound aet in.

Origin of the outbreak of gangrene in the hospital.—I cannot write with confidence, as to the origin of the outbreak of this disease in the hospital of H. M.'s 29th Foot. The inflammation terminating in gangrene had made its appearance several days hefore the charge of the wounded was transferred to me. After close observation of the cases attacked with gangrene, subseqnent to my arrival at Ferozepore, I have no besitation in pronouncing the form of spreading gangrene under notice, a local disease, more than a constitutional disease. It ia difficult to separate one from the other: but if it hc necessary to draw a line of distinction between the two, then, in my opinion, the disease originated in, and was propagated through the medium of a foul contaminated atmosphere. The Ferozepore atmosphere, in and around the hospitals, was poisoned by putrid exhalations. That which is applicable to one hospital, holds good with regard to all. The foul and contaminated

air in the hospital, originated, not through any defect in ventilation, but in the overcrowded state of the wounded. The poisoned state of the atmosphere outside arose from the numbers of dead animals, camels, bullocks, dogs, which lay about cantonments, in a state of decomposition, only half devoured by the kites and vultures, as well as from the heaps of poultices, and rags, and dressings, filth of every description, which collected in the immediate vicinity of the hospitals.

That hospital gangrene owes its origin more to the foul, contaminated air in the hospital, than to any peculiar predisposition in the constitution of the persons attacked, may be inferred from the fact,—that the wounds of the robust, and the weakly;—of the plethoric, and the anæmic;—of men walking about the hospital, and of men unable to raise themselves in bed from sheer debility, were attacked indiscriminately by the disease. Further, that in spreading through an hospital, it commits its ravages through the medium of a poisoned atmosphere, may be inferred from another simple fact, that from and after the 11th of March, the morning on which we cleared out of Ferozepore, for the Hill station of Kussowlie, the disease disappeared. A still stronger proof may be instanced, in support of this opinion. Two days before the start was made for the Hills, there were six men, whose wounds had taken on an angry, unhealthy, suspicious appearance. It was too evident, the incipient stage of hospital gangrene had set in. On the march, the marks of irritability, and inflammation passed away, and the orifices of the wounds recovered their healthy action, under no other treatment than the dressing of the parts with simple cerate. It may be stated, that in one case alone, was the nitric acid applied after our march from Ferozepore. The gangrenous condition of the wound was thoroughly established, before the patient was removed from the hospital. Leeches, scarifications, poultices and fomentations did not arrest the spread of the disease—nor did change of air effect any improvement in the local disease. On the third day's halt, I used the nitric acid. A narrow circular band, deeply burned by the acid, circum-

scribed the gangrene, and effectually checked its progress. The circle was burned in the sound skin, at a short distance from the line of separation between the living and dead tissues. The gangrenous mass separated from its attachments to the surrounding parts, and sloughed away. The yellow band became detached. The edges and surface of the wound were clean and healthy after the separation of the sloughs, and when we arrived at Kalka, Private Wilson was able to leave his dooly, and walk about.

So convinced do I feel, that this specific inflammation terminating in the destruction of the vitality of the tissues, originates in, and is propagated by an impure, contaminated, poisoned atmosphere; that had the wounded remained a few weeks longer at Ferozepore, scarcely a single case would have escaped its influence.

When the circumstances of war render the removal of the wounded impracticable, medical men must be prepared to combat the disease in its different etages, by remedial measures. The immediate removal of the wounded from the infected locality when practicable, will be found the safest and the most expeditious mode of guarding against the spread of gangrene amongst the wounded inmates of the hospital. This measure of prevention, by change of locality, is the sovereign remedy for protecting the uninfected wounds from the effects of gangrene, when it has broken out, in a hospital. This is also the sovereign remedy for aiding the remedial measures, employed to check the spread of the gangrene in the infected wounds, by restoring tone to the system, and by re-establishing a healthy action in the wounded parts.

At the termination of the Sutlej Campaign, these Notes were published, in 1846, in the Calcutta *Englishman*, and afterwards in the London Medical Gazette. In Part X. of the India Register of Medical Science, or the No. for October 1848, was published Surgeon Taylor's Report of the killed and wounded in H. M.'s 29th Regiment with the Army of the Sutlej in 1845-46. From this valuable Medical History, I have extracted that part which embodies the opinions of Sur-

geon Taylor relative to the outbreak of gangrene in the hospital. It was during Surgeon Taylor's absence, that gangrene committed such fearful ravages amongst the wounded, when I was in sole medical charge with no other assistance than that afforded by Mr. J. Gorman, the Steward and Acting Apothecary, by Mr. Turvey, hospital apprentice, by Private John Black, and Corporal Patrick O'Neill who performed the duties of Orderlies with indefatigable zeal, although their own wounds were still unhealed. To Mr. Gorman and Mr. Turvey, the greatest praise is due for their exertions in dressing and otherwise attending to the wounded.

The paucity of medical officers with the Army of the Sutlej, rendered it necessary for those in medical charge of the wounded, to redouble their exertions to alleviate the sufferings of the gallant fellows in the hospitals at Ferozepore. On my return to Gwalior, I was favored with letters which I take the liberty to introduce here.

My dear Moore,—Deeming it probable that you may shortly be directed to return to your duties at Gwalior, I take an early opportunity of expressing before your departure, my sense of your highly valuable services, during the time you have been doing duty with the Regiment under my command.

You were appointed to it at a time the most trying, and when, from the great number of wounded men in the hospital, it was sufficient to daunt the oldest and most experienced Surgeons, yet, nevertheless, I observed with the greatest satisfaction your unremitting exertions in the cause of humanity, as well as in the welfare of the service, and believe me, I shall ever remember the attention you manifested in the performance of your arduous duties with unmixed gratification. Advancement in the higher grades of your profession will be a source of the greatest pleasure to me to hear of, and that you may soon obtain the step you desire, is the sincere wish of

Yours very sincerely,

(Signed) Geo. Congreve,

Lieut.-Col., Commanding H. M.'s 29th Regt.

Kussowlie, April 5th, 1846.

True Copy.

Ferozepore, 12th March, 1846.

Dear Sir,—I cannot allow you to leave this station without thanking you for the indefatigable zeal and ability shewn in the performance of your duties at the Depôt Hospital, with the sick and wounded of H. M.'s 29th Regiment; of which for some time after the hattles of Moodkee and Ferozeshuhur, (during the ahsence of Snrgeon Taylor, with the Head-Quarters of the Corps) yon had sole medical charge.

The emergency was one, whicb both from the number of wounded and the paucity of medical officers required from us all, our ntmost exertiona, and yours, I feel bound to say, were unceasing, and in spite of fatigue, you managed to perform all your important operations and hy your unwearied activity and professional attainments, did all that medical skill could do, to alleviate the sufferings, and miseries of the gallant fellows under your care.

In truth, your devotion to your duties has been not only highly creditable to yourself, but also a matter of great pnhlic benefit, and it would afford me great pleasure to see you a member of the Bengal Medical Service, where your merits would meet with a better reward, than any you can ressonahly expect to receive from the Gwalior government. With hest wishes,

I remain, dear Sir,
Yours very faithfully,
(Signed) J. Graham, M. D.,
Surgeon Superty. Depôt Hospitals at Ferozepore.

To Thomas Moore, Esquire,
Scindia's Contingent, Gwalior.

Trne Copy.

No. 671 of 1846.

From F. CURRIE, *Esquire*,
Secretary to the Government of India,
With the Governor General.

To DR. THOMAS MOOAE,
Assistant-Surgeon, Scindia's Contingent, Simla.

Dated Simla, 13th April, 1846.

Foreign Dept.

SIR,—I am directed by the Right Hon'ble the Governor General to request that you will return with all convenient expedition to your duties with Scindia'a Contingent.

2. I have laid before the Governor General the letter from Colonel Congreve, Commanding H. M.'s 29th Foot, which you placed in my hands the other day. His Excellency has desired me to communicate to you his satisfaction at your conduct having merited the high eulogium passed on you by Colonel Congreve, and to forward a copy of the Colonel's letter for the information of your immediate official superiors, Colonel Sleeman, and Brigadier Wymer, C. B.

3. Colonel Congreve's letter is herewith returned.

I have the honor to be, Sir,
Your most obedt. servant,
(Signed) F. CURRIE,
Secretary to the Government of India,
With the Governor General.

True Copy.

From 25th December to 26th January.

"Between the 25th of December, the date of opening Hospital at Ferozepore, and the 26th of January, the day I gave over charge of the hospital, 24 of the wounded had died and 76 had been discharged. But 13 had been re-admitted, and eight cases of other diseases had also been sent in from the camp, there remained therefore on the 26th of January a total of 103 under treatment. The following is a copy of a Report of sick and wounded in H. M.'s 29th Regimental Hospital, which I forwarded to the Superintending Surgeon of the Army of the

Charge of the wounded transferred to Assistant Surgeon Moore.

Sutlej, upon giving over charge of the Hospital to Assistant Surgeon Moore of the Gwalior Contingent Service.

Copy of Report of sick and wounded of H.M.'s 29th Regiment in Ferozepore on the 26th January 1846.

"The total number of patients in Hospital is 103. Of this number, 95 are suffering from wounds received in action on the 21st and 22nd ultimo. The remaining 8 have been since admitted for other ailments. These 8 men are likely to be fit for duty very soon. Of the 95 cases of gun-shot wounds now under treatment, 51 will probably be able to return to their duty in the course of next month, the remainder of the gun-shot wounds are severe cases, either such as totally disable the men for further service, or disqualify them for duty for a longer period than remains of this cold season. These 44 severe cases are as follows:

"Stump cases, ...		6
Compound fracture,	Upper extremities, ...	9
	Lower extremities, ...	6
Injuries of joint, ...		5
„ head, ...		2
„ trunk, ...		1
„ bones of foot, ...		2
„ bones of hand, ...		2
Flesh wounds, ...		11
Total, ...		44

"Included in the above statement are 8 cases of Hospital gangrene, of which disease there are to-day 15 cases under treatment. Patients with this gangrene are lodged in tents apart from the rest. The 8 cases included in the above list of severe cases of gun-shot wounds are:

Stump cases, ...	2
Compound fracture, ...	1
Flesh wounds, ...	5
Total, ...	8

(Signed) J. R. Taylor,
Surgeon, H. M.'s 29th Regiment."

"Hospital gangrene appeared amongst the wounded at Ferozepore a few days after the prevalence of tetanus had attracted notice. The first case in the Hospital of the 29th Regiment occurred, I believe, a little later than in the Hospitals of other corps. At all events in this case, which was a stump case, the disease declared itself on the 18th of January and between that date and the 26th of the same month, 15 cases had come under treatment. At first I could tell by the peculiar dark florid countenance of the patient, that his wound had taken on this gangrenous affection, yet I cannot say, that in these cases there was any marked inflammatory fever. Subsequently in the prevalence of the disease, this dark red colour of the face was neither well marked nor by any means so constant.

Hospital gangrene.
Date of first case.

Symptoms.

"In many cases the disease seemed purely local. But in the great majority, there was certainly much feverish constitutional disturbance accompanying the local affection, and often preceding it. My experience of the disease as it occurred amongst the wounded at Ferozepore, does not enable me to determine satisfactorily to myself, whether it is essentially a local or a constitutional affection. I am inclined to place it in the former category—and there is no doubt whatever in my mind, that the essential means of treatment are local.

"The appearances presented by a wound affected with the hospital gangrene were as follows:—In the centre, a more or less dirty brown or even black deliquiscent slough or discharge; and approaching the circumference of the wound, the slough more consistent and blending with a livid vesicated margin of integument, surrounded again with a dark angry red colour of the skin gradually subsiding into the natural colour of the limb. The livid vesicated margin and surrounding inflammation frequently occurred with merely a dirty unhealthy discharge. In other cases, and these by far the most serious, there was slough like a piece of shoe leather. With these local appearances, as I have said before, a great majority of cases presented feverish symptoms, of a bilious or

inflammatory type. One invariable result of the gangrene was to spread the wound in a circular or oval form. I do not think the disease affected other structures than the skin and cellular membrane, and frequently, after the separation of a slough, I have seen the muscles and tendons underneath, fairly dissected, and the latter standing out in great relief, glistering and sound. In the case of Captain Stepney, wounded at Sobraon by grape-shot through the thigh, both openings of the wound took on Hospital gangrene, and after the separation of the sloughing, the inner ham-string tendons were completely dissected, that the finger could be passed behind them. Granulations subsequently closed them in without obstructing their use.

There are some curious particulars to be noticed regarding the Hospital gangrene. Sometimes both orifices of a wound took on the disease: sometimes only one—and instances occurred where the patient having more than one wound, the gangrene only attacked one orifice of one wound. These facts seem to point to its local nature. Further it was so constant as to excite remark, that where the gangrene attacked only one orifice of a wound, that orifice was generally the orifice made by the exit of the shot. And during the height of prevalence of the disease the incision made to remove a ball, was nearly sure to be affected with the gangrene. I think I observed also, that grape and canister-shot wounds were more obnoxious to the gangrene than bullet wounds. But this impression may be erroneous, arising from the greater number of wounds being from artillery. I certainly, in one instance, saw common sphacelus and Hospital gangrene running their course together on the arm stump of Private Eustace. He was one of those in whom, the bad effects of the epidemic remittent fever of 1844 on his constitution, were observed to cause the wound to take on unhealthy action. I cannot give the termination of this case. He appears to have been alive when the invalids embarked at Ferozepore, and (of whom, he was one) when they reached Bombay.

On the subject of the origin of this disease and its prevalence

at Ferozepore, I have only to offer the generally received explanation, such as the crowding of a large number of wounded, infection and contagion.

The wounded under my charge occupied the regular military Hospital of the station, which was the only finished barrack building at Ferozepore. The barrack bungalows, all of which were given up for the accommodation of the wounded, were occupied by the wounded of other corps. How I came to be so fortunate as to secure the Hospital I do not know, for others had reached Ferozepore before me; but I found it empty, and immediately took possession. This Hospital building I should say is one of the best contrived in India for space and ventilation, but it is very badly built. It consists of three large wards opening one into the other in a line; a long, closed, and also an open verandah on either side, run the whole length of the three wards and join a verandah at each end, which covers in three small rooms, used as dispensary and store-rooms. The centre wards are very lofty, and the angle of the roof is open the whole length, for purposes of ventilation, whilst at the same time, the opening is so contrived as to keep out rain. Another point facilitating ventilation is, that the openings from the wards into the inner or closed verandah, rise in an arched form to nearly the top of the side walls. The roof is thatched.

This building is calculated to accommodate 150 sick, the ordinary estimate of accommodation required in the country; and 150 ordinary and mixed cases might be treated in it without any anticipation of ill effects from number. But 182 wounded were, in a sanatory sense, very much crowded in it. The verandahs as well as the wards, were necessarily filled with patients; and, in both, the cots were pretty close together.

The circumstance, however, which in my opinion mainly contributed to the appearance of Hospital gangrene, was the exposure of the wounded on the field for four days after the receipt of their wounds; and in fact, it was not till the fifth day that many of the wounded were cleaned and dressed. The stench of most of them from the state of their clothes, stiff and

rottcn with putrifying blood and dischargc, was enough, with other circumstances attending the exposure and privation, to have produced an infectious disease of some kind, and I believc the Hospital gangrene to have so originated.

The wounded at Aliwal who were not in the first instance subject to such expoaure, privation, and neglect, and who were not crowded at Loodianah, did not suffer from Hospital gangrene; and the wonnded at Snhraon, when in Ferozepore, to which station they were removed dnring the three or four daya after the action, did not suffer from the disease, in hy any means so large a proportion as the Ferozeshuhur wounded, though when they joined the latter at Ferozepore, the prevalence of the gangrene waa at its height. Of a total of 51 of the severer cases of Hospital gangrene amongst the wounded of H. M.'s 29th Regiment, 42 were Ferozeshuhur cases, and only 9 Suhraon.

An error: the number has been under-rated. In one morning I applied the acid to 6 cases.

It is to he observed too, as illustrating the possihility of the gangrene infection lying dormant for some days, or of the fomites of the disease hanging about the clothing of the men—that wounded men discharged fit to rejoin the regiment, were in several instances returned from camp to hospital with Hospital gangrene.

An error: not one.

In the treatment of this disease I proceeded regularly on one plan, and found that so efficacious, that I was not inclined to try any other. The plan adopted was the application of the strong nitric acid so aa completely to cut off the diseased from the sound part—or so far sound part, as only to he affected with inflammation. The acid however required to be ruhbed in with the hluut end of the prohe, so that it not only destroyed the cuticle hut killed the cntis vera, and probahly the cellular membrane underneath. The narrow yellow ring of dead skin thus formed, separated like a piece of leather, generally carrying with it the whole alongh, and leaving a clean healthy *surface* aa well as *edge* to the wound. I never attempted to apply the acid to the surface underneath the slough, neither is such application necessary—the vital seat of

the disease is on its circumference, however large its area. I must admit that the disease sometimes crossed the acid boundary, and a second and even a third application of the remedy was required; but this was rare. Neither was constitutional treatment neglected, but this varied according to the state of the patient—emetics—purgatives—salines, and low diet being sometimes required; whilst in other instances, ether, ammonia, laudanum, and generous diet were administered. When speaking of the symptoms of this disease, I should have mentioned that a burning, gnawing pain was sometimes loudly complained of. The application of the acid soon removed that pain, and the acid itself did not often seem to produce much suffering. In one instance, deemed a favourable one, I tried venesection, and, I fear, did mischief. Calomel and antimonials were useful. I did not try the arsenical solution. The change of air, which the march of the wounded on their return to Knssowlee occasioned, certainly had very beneficial effects on all the gangrenous and sloughing sores.

At the same time that hospital gangrene was prevalent at Ferozepore, some wounds took on a malignant fungus affection which spread over the healthy surface like the hospital gangrene. The dirty, fibrous looking fungus growth, rose considerably above the edges of the wound, partially over-lapping them. These edges were inflamed, but not livid, and vesicated as in the cases of gangrene, but here also the disease took the circular or oval form. The affection here noticed I observed only in wounds of the fore-arm and hand. Colonel Barr's wound, which was of the fore-arm near the wrist, took on this disease. The application of nitric acid in the same way as for hospital gangrene eventually checked its progress. One finger of a private thus affected I was obliged to remove. Colonel Barr's wound was a compound comminuted fracture of the radius from grape-shot, which penetrated, but did not lodge. He was an exceedingly large, stout, fat man, and known to be of a bad habit of body. He had been twenty years in India. His death was occasioned by a sudden hemorrage from the radial artery, from the effects of which he never rallied. In

no case that came under my observation, did the gangrene directly prove fatal, though in many cases it contributed largely in bringing about an unfavourable termination.

I regret that the deficiency of records from causes before mentioned, prevent my being able to state with numerical accuracy, the proportion of mortality amongst the different varieties of compound fractures, injuries of the head and other of the more interesting classes of gun-shot wounds. The report therefore, which I have to offer of such cases, will be very scanty and imperfect."

Art. V.—Notes on the use of Lunar Caustic in the treatment of Hydrocele.

A case of hydrocele was brought to me, a few years ago for treatment, when I proposed by way of experiment to inject the sac with water containing in solution, one grain of lunar caustic. The sac contained 15 ounces of fluid, of a pale straw color. After its removal, the pipe of the Indian rubber bottle was fitted to the canula and the caustic solution injected. The injected fluid was retained in the sac about two minutes, when it was drawn off, and the canula removed.

No unpleasant symptoms arose during the injection of the solution, nor during 48 hours afterwards. On the third day after the operation, swelling, tension, and heat of the scrotum set in, attended with a considerable degree of pain: pressure caused uneasiness; with these local symptoms, the pulse was quick, sharp, and wiry, the tongue was foul and furred;—the skin was hot and dry;—the constitutional irritation was marked.

In addition to purgatives, followed by tartar emetic mixture, the scrotum was fomented and covered with bran poultices, changed every second hour. In the course of three days, the local inflammation subsided, and with it, the fever. So long as the man remained under observation, there was no return of the fluid in the sac, from which circumstance, I infer that adhesion of the opposed surfaces had taken place, and with that adhesion, total obliteration of the sac. The testicles felt sound, so that the case was regarded as hydrocele of one side, uncomplicated.

Case, No. II.—Ramdeen, villager, came to me for the purpose of being operated on for a hydrocele on each side. With a view to test the efficacy of lunar caustic injection, the serous fluid from each sac was drawn off, the quantity contained in the left tunica vaginalis exceeded by 4 ounces that in the right. Two grains of lunar caustic were dissolved in four ounces of water, which was then put into the India rubber bottle, and injected into the hydrocele sac of the left side. The sac on the right side was not interfered with, farther than drawing off

the serous fluid. An examination of the testicles did not disclose any disease of these glands.

The operation was not attended with pain either at the time of the caustic solution being injected, nor for 36 hours afterwards. On the second morning, however, the scrotum was intensely hot, swollen, shining, tense and painful on the least pressure, inflammatory fever had set in with this local condition of the parts:—the pulse was full, strong, and bounding. His skin was hot and dry:—the tongue foul and loaded, the breath hot and fetid, there was loss of appetite, with a good deal of thirst.

The local treatment consisted of fomentations and bran poultices, changed every second hour, and the smearing of the scrotum with oil containing 1 drachm of blue ointment to the ounce. The constitutional treatment consisted of purgatives in the first instance, followed by a solution of tartar emetic, 1 grain to 1½ ounces of water, given every hour in one ounce doses.

The inflammatory condition of the scrotum soon subsided, and with it, the feverish symptoms. During the time the man remained under treatment, there was no trace of the sac on the left side which had been injected, refilling with serous fluid, whilst the hydrocele sac on the right, had perceptibly refilled, and contained, as well as could be ascertained, from 4 to 6 ounces of fluid. The efficacy of the lunar caustic in causing obliteration of the hydrocele sac, by the agglutination of its opposed surfaces, was clearly proved in this case.

Case, No. III.—Proutie, a villager, was operated on for double hydrocele, on the 15th November, 1850. After the fluid was drawn off, the sac was injected with water holding in solution 2 grains of lunar caustic. The injected fluid was kept in the sac for 3 minutes. There did not arise any unpleasant symptoms for 48 hours. The scrotum felt painful, tense and inflamed,—the constitutional symptoms were those of high inflammatory fever, after the lapse of this time. However with the aid of purgatives, and tartar emetic internally, and poultices externally, the local distress was removed. There was no

return of fluid in the sac, up to the period of his returning to his village, so that it is probable, the obliteration of the hydrocele sac was complete.

Case, No. IV.—Sewpursaud—about 40 years of age, was tapped for hydrocele in December, 1851. In addition to the collection of fluid in the sac, there was considerable enlargement and induration of the testicle of the right side, corresponding to the hydrocele sac. The lunar caustic injection was prepared and forced into the sac after the serous fluid had been withdrawn. It was retained for a short time, and then allowed to flow away. Acute inflammation of the sac, and also of the cellular tissue of the scrotum ensued within the second day after the operation, considerable pain and fulness set in, and continued for some time in the body of the diseased testicle. After the inflammation of the parts had been reduced by fomentations and poultices, the induration of the testicle yielded to friction of blue ointment mixed with the emplastrum cantharidum in equal parts.

The employment of lunar caustic in this case, ended in the complete obliteration of the hydrocele sac.

Case No. V.—A zemindar, after labouring for two years under hydrocele of the left side, applied to me in December, 1850, to be relieved of his complaint. After examining the sac it was decided that the case was fit for operation. The fluid was drawn off; but unlike that usually contained in hydrocele sacs, was thick, dark-coloured, and oleaginous. This secretion had evidently been the result of chronic inflammation of the internal surface of the tunica vaginalis which membrane felt thick, or hypertrophied under the fingers, after the removal of the contents of the sac.

The lunar caustic injection was made stronger than usual, by the addition of one grain,—holding in solution 8 grains;—slight pain was felt in the sac, after the introduction of the nitrate of silver. In the course of 12 hours, acute inflammation set in; the sac became painful,—heat, tension, and swelling of the scrotum followed—inflammatory fever kept pace with the local irritation and inflammation of the hydrocele sac and the surrounding parts.

Purgatives and tartar emetic mixture, checked the fever; whilst the application of poultices to the scrotum, reduced the swollen and inflamed condition of the parts. These measures combined with the use of mercurial frictions to the scrotum, removed all trace of swelling, with the exception of the toughened hydrocele sac on the left side. Complete obliteration of the sac by the agglutination of its chronically inflamed surfaces, through the medium of effused lymph appeared to follow the use of the nitrate of silver injection in this case.

The nitrate of silver injection appears to act in a twofold manner in preventing the hydrocele sac from refilling, or in effecting a radical cure of the disease. In the generality of cases, the sac becomes obliterated by the effusion of plastic lymph, agglutinating the surfaces together. In a few, however, the sac remains unobliterated;—whilst the abnormal effusion of serous fluid appears to be arrested by the action of the lunar caustic on the secretion of the serous surface. In either case, the lunar caustic in its effects is speedy and certain, after the solution has been injected into the hydrocele sac.